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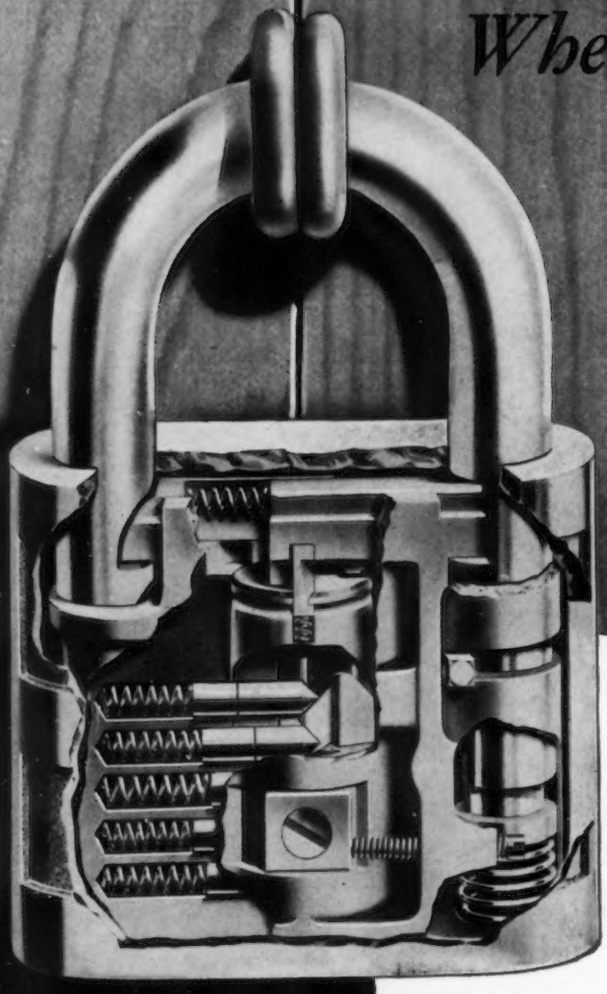

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Contents—September 10, 1936

Poisoning the Wells 33
Lathe Cutting of Monel Metal 34
Flexibility in Press Layout 40
Evaluating Shop Jobs by the Point System 42
Tool Engineering and the Society of Tool Engineers 48
Isolating Vibrations Set Up by Power Hammers 50
Machinery Exports 1936-1937 53
Crobalt Enters National Cutting Field 56
Automotive Industry 58
Statistics on Metal-Working Activity 62
Rate of Activity in Capital Goods 63
Washington News 64
NEWS CONTENTS 76
Products Advertised 161
Index to Advertisers 186

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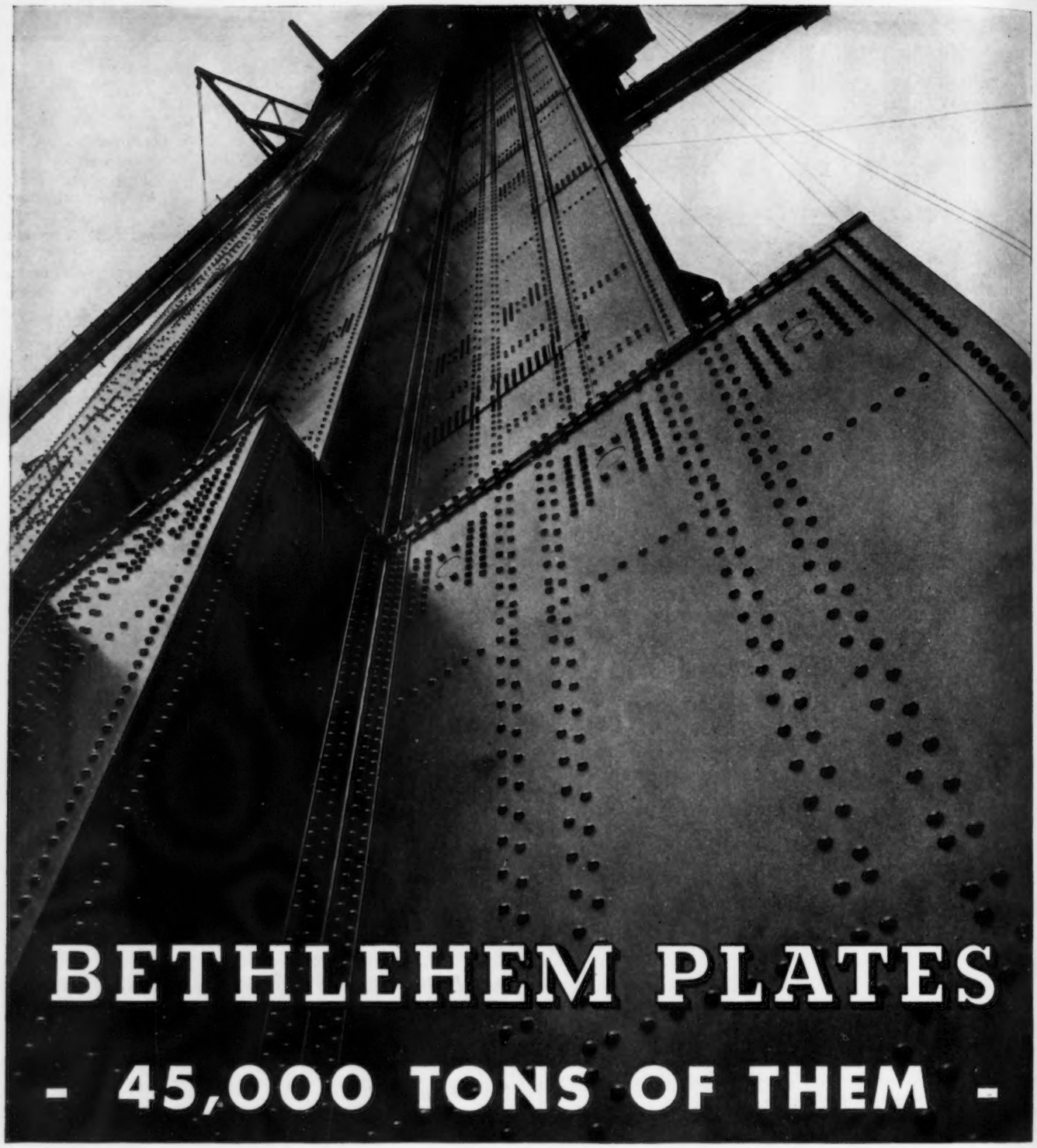

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SEPTEMBER 10, 1936

ESTABLISHED 1855 Vol. 138, No. 11

Poisoning the Wells

ONE of the strangest delusions of the New Deal is its belief that it can advance the interests of employees by opposing the interest of employers.

Interests and rights are two altogether different things. If I am a laborer in a steel mill or an automobile plant, I have a right to a fair wage for a full and satisfactory day's work. The stockholders who have financed my company have a right to a fair return on the money they have invested. And the management of my company has a right to a fair wage for management and supervision. So far as these "rights" are concerned, there is room for distinct differences of opinion as to the relative shares which may be considered ethical from the social standpoint.

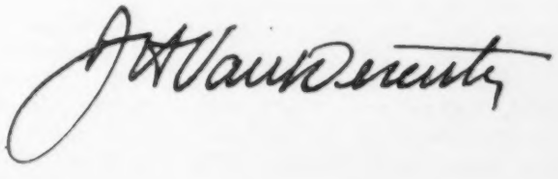
All of these social and ethical "rights" from the practical standpoint are subordinate to the fact that you cannot divide pie that hasn't been baked. You can debate at length as to whether George, representing Labor, should get a 67 per cent slice of the pie or a 70 per cent slice. But that does not get George anywhere. He wants pie, not percentage.

That is where the distinction comes in between rights and interests. There can be differences of opinion as to rights and percentages, but ordinary common sense tells us that it is to the interest of all groups to make the pie larger and against the interest of all groups to make it smaller.

This plain and very practical point is overlooked by the New Deal. It has dealt in its legislation and administration, as well as in its politics, with rights and percentages not only to the exclusion of common interests but to their detriment.

In promoting and abetting labor warfare and class antagonism, in its vicious attack upon big business which bakes most of the pie for George, in its repeated efforts to cripple and handicap the progress and future of industry through injudicious taxation of surpluses, in the piling up of unprecedented national debt through unheard of extravagance, the New Deal, ostensibly a defender of labor's rights, is actually an enemy of labor's interests.

It is acting like the Arab chief who poisoned the wells in order to do away with his enemy, overlooking the fact that both he and his own tribesmen had no other source of water.



Lathe Cutting of *Monel*

SO far as known, nothing having a direct experimental basis has been published as to the relations between cutting speed, tool life, tool shape, depth of cut and feed when machining Monel Metal. For this reason the accompanying partial report of lathe tests of this extensively used copper-nickel alloy should afford data useable by machine shops generally.

Although independently conducted, the tests here reported take a place as part of larger investigations in the broad field of metal cutting. One such is that sponsored by the American Society of Mechanical Engineers, which is engaged in an attempt to put the cutting of metals on an engineering basis. Part of this project is the setting up of a basic mathematical ex-

WHILE there is extensive literature on the cutting of metals, practically no information is available on the cutting of the various copper and aluminum alloys or Monel Metal.[1] Since Monel Metal is an extensively used alloy, it is believed that information on the lathe cutting of this metal would be of value to industry. The experiments discussed in this paper were carried out under the direction of R. C. Deale, executive secretary of the A. S. M. E. Sub-Committee on Metal Cutting Data.

The investigation may be divided into three main parts, namely, (1) determination of the effect of cutting speed on tool life. (2) the effect of feed on tool life, and (3) the effect of depth of cut on tool life.

Power measurements were also taken for most of the tests by reading a voltmeter and ammeter placed in the power circuit.

Hot forged Monel Metal rounds, rough turned to a diameter of approximately 7½ in., and 38 in. long were used in these tests. The chemical analysis of this material was: Carbon, 0.12 per cent; sulphur, 0.005; silicon, 0.07; manganese, 0.81; iron, 1.16; copper, 31.21; and nickel, 66.49 per cent. The Tensile properties determined from transverse tests were: Tensile 95,000 lb. per sq. in., yield point 78,000 lb. per sq. in., elongation in 2 in. 23.0 per cent, reduction in area 55.5 per cent. Brinell hardness varied from 207 at the center to 224 at the outer surface.

One Tool Shape Used

The tool bits were of high-speed steel of the 18-4-1 type, ⅝ in. square. Analysis of the tool steel is as follows: Carbon 0.78-0.83, manganese 0.20-0.25, phosphorus 0.025 max., sulphur 0.03, chromium 3.50-4.00, tungsten 17.25-18.25, and vanadium 0.90-1.10. The heat treatment was as follows:

Operation	Temperature (Deg. F.)	Time (Min.)	Atmosphere
Preheat	1600	13	
Hardening .	2400	4¾	8-10% CO
Tempering .	1100	240	

Only one tool shape was used throughout the tests, which was as follows: 14 deg. side rake; 15 deg. front relief; 6 deg. side relief; 6 deg. end cutting edge angle; 20 deg. side cutting edge angle; nose radius ⅛ in.; 8 deg. back rake was produced by the tool holder. All tests were run "dry."

A heavy-duty, cone driven lathe with a swing of 26 in. and a distance of 36 in. between centers,

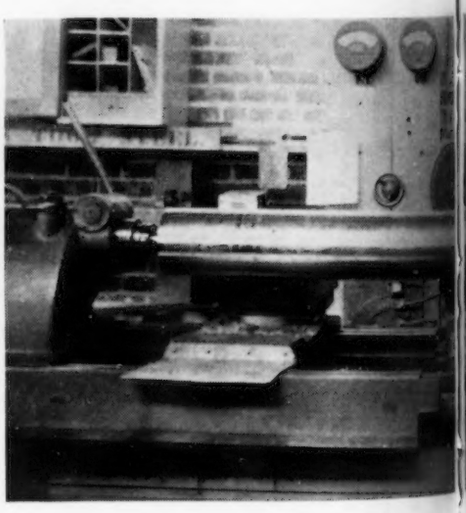


FIG. 1—Set-up of apparatus

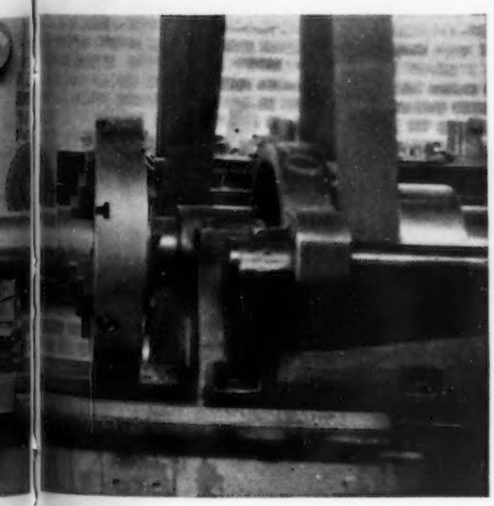
Metal...

By MELVIN MATSEN
Montana State College, Bozeman, Mont.

pression that will establish the relation between cutting speed, tool shape, depth of cut, feed and tool life under cut. The experiments of Mr. Matsen, carried out in cooperation with the A.S.M.E. sub-committee on metal cutting, provide data that permits comparing the tentative relationships for cutting iron and steel with those obtained in cutting a metal having quite different characteristics.

But in addition to their use in connection with studies in the general field of metal cutting, the data here published should be immediately useful in current shop practice. The tools are of a shape that approximate those in general use, and the range of feeds and depths should meet ordinary shop requirements.

was used. It was equipped with an adjustable speed, 10 hp. direct-current motor so that any possible cutting speed could be obtained within the range. In order to obtain smaller feeds than the gears on the lathe permitted, a new set of feed gears was made. To eliminate friction as far as possible at the tail center, a new center, having ball and roller bearings, was built. It proved very satisfactory. Fig. 1 shows the set-up of the apparatus.



pparatus.

A special tool-holder (Fig. 2), designed and built by the author, proved effective in that it was very rigid and allowed no slippage of the tool bit. It was similar to the tool-holder used by H. J. French and T. G. Digges[2] in the rough turning of steel, in that two bits, one ⅝ in. square and the other ⅜ in. square, may be held in place at the same time, thus allowing the use of a trailer tool if necessary. The main body of the tool-holder is one piece of steel, the top piece being held in place by six cap screws. The tool bits are placed in their respective grooves and held in place by set screws. At the end of each groove is a bolt with a lock nut which backs up the bit, thus preventing slippage. Since 8 deg. back rake was desired on the tool bits, the tool-holder was made to give this rake; thus no back rake was ground on the bits.

The tool bits were carefully ground to a sharp edge. The nose radius was ground by hand to conform to a standard templet. After grinding, the cutting edge and face were honed to remove any burrs.

It was not necessary to use the trailer tool for any of the tests herein described.

The cutting speed was measured on the uncut portion of the log with the aid of a tachometer. This was checked by the r.p.m. and diameter of the log.

Depth and Speed Checked Frequently

To assure a uniform depth of cut and cutting speed, the two were checked frequently during the test. Before the actual cutting began on a test, the lathe was allowed to run for several minutes until the power reading showed constant value.

The tool life was determined by close observation of the cutting edge of the tool during the test. For feeds less than 0.015 in. per revolution it was found that the

tools failed by nose abrasion. Failure of the cutting edge could be observed to begin at the outermost part where the cutting speed was the greatest and then proceed inward. Feeds greater than 0.015 in. caused the tool to fail by cratering. It was observed at times that the tool bit would require a built-up cutting edge of Monel Metal, a phenomena observed in the cutting of steel.

For practically all large feeds and depths of cut used, it was observed that the chips came off in the form of large spirals which became smaller in diameter as the tool became dull. Before the breakdown of the cutting edge the chips formed short, slightly curved pieces. Considerable trouble was encountered in turning with small feeds in that the chips would tend to curl about the tool and wedge between the tool-holder and the revolving Monel Metal round.

In determining the effect of cutting speed on tool life a depth of cut of 3/16 in. was used throughout with feeds of 0.0033 in., 0.0132 in. and 0.0284 in. with variations in cutting speed and tool life. Table 1 shows the results of tests run at the above mentioned feeds.

TABLE 1—Results of Tests to Determine Effect of Cutting Speed on Tool Life.
(Feeds of 0.0033, 0.0284 and 0.0132 in.)

Test No	Cutting Speed (ft. per min.)	Correction Factor	Corrected Cutting Speed	Tool Life (min.)	Feed (in.)	Depth of Cut (in.)
3	295	0.965	285	1 20	0.0033	3/16
4	298	0 965	297	1 16	0.0033	3/16
5	300	0.965	289.8	1.13	0.0033	3/16
6	296	0.965	286	1.23	0.0033	3/16
11	225	1.041	234	6.33	0.0033	3/16
12	237	1.041	246.9	6.18	0.0033	3/16
15	246	0.965	237.5	4.00	0.0033	3/16
16	251	0.965	242.1	10.25	0.0033	3/16
17	239	1.029	246	6.30	0.0033	3/16
18	236	1.029	242.2	4 95	0.0033	3/16
19	232	0.960	222.6	6.25	0.0033	3/16
20	286	0.960	274.2	5.60	0.0033	3/16
21	302	0.960	290	2.41	0.0033	3/16
22	305	0.960	298	2.07	0 0033	3/16
23	302	0.960	290	1.63	0.0033	3/16
25	261	0.960	251	4.83	0.0033	3/16
26	256	0.960	246	2.85	0.0033	3/16
28	254	0.960	244	2.08	0.0033	3/16
29	260	0.960	250	3.00	0.0033	3/16
30	256	0.960	246	6.00	0.0033	3/16
31	222	1.046	232	11.25	0.0033	3/16
32	223	1.046	233.7	8.75	0.0033	3/16
33	216	1.046	226	11.25	0.0033	3/16
34	222	1.046	232	6.25	0.0033	3/16
36	222	1.050	233	5.18	0.0033	3/16
37	232	1.050	243.8	9.00	0.0033	3/16
38	206	1.164	240	39.16	0.0033	3/16
39	209	0.998	208.7	34.02	0.0033	3/16
40	208	1.090	226.4	13.01	0.0033	3/16
41	212	1.090	231	9.97	0.0033	3/16
42	210	0.998	209.8	10.81	0.0033	3/16
43	201	1.164	234	27.81	0.0033	3/16
44	237	0.908	215.6	16.61	0.0033	3/16
45	241	0.986	238	13.70	0.0033	3/16
47	242	0.903	218.5	14.81	0.0033	3/16
50	213	0.976	208	17.50	0.0033	3/16
51	213	0.976	208	21.38	0.0033	3/16
52	214	0.980	210	23.51	0.0033	3/16
55	135	0.917	124	2.95	0.0284	3/16
56	127	0.917	116.4	2.88	0.0284	3/16
57	122	0.980	119.8	2.78	0.0284	3/16
58	118	0.980	116	4.06	0.0284	3/16
59	118	1.010	119.2	2.33	0.0284	3/16
60	115	1.010	116.1	4.60	0.0284	3/16
61	107	0.980	105	6.63	0.0284	3/16
62	107	1.050	112.3	4.33	0.0284	3.16
63	107	1.050	112.3	4.40	0.0284	3/16
64	105	1.127	118.2	3.25	0.0284	3/16
65	104	0.954	99.0	7.85	0.0284	3/16
66	105	0.954	100	10.25	0.0284	3/16
67	103	0.992	103	7.83	0.0284	3/16
93	100	0.934	93.4	13.28	0.0284	3/16
94	112	1.030	115.4	3.10	0.0284	3/16
95	108	1.030	111.2	5.67	0.0284	3/16
96	96	0.934	89.6	17.67	0.0284	3/16
72	162	0.975	158	8.30	0.0132	3/16
73	162	0.995	161.2	7.07	0.0132	3/16
74	162	0.990	160.3	7.35	0.0132	3/16
75	151	1.005	151.9	10.88	0.0132	3/16
77	177	0.971	172	4.88	0.0132	3/16
78	176	1.005	177	3.47	0.0132	3/16
79	174	1.000	174	3.65	0.0132	3/16
80	175	0.971	170	3.60	0.0132	3/16
81	151	1.110	167.6	5.00	0.0132	3/16
83	153	0.970	148.3	14.67	0.0132	3/16
84	153	0.990	151.8	11.75	0.0132	3/16

Relationship Between Speed and Tool Life

In attempting to derive a mathematical relationship between cutting speed and tool life, the cutting speed was plotted against tool life on log—log coordinate paper keeping the feeds separate. From the curves thus obtained the following approximate relationships are found:

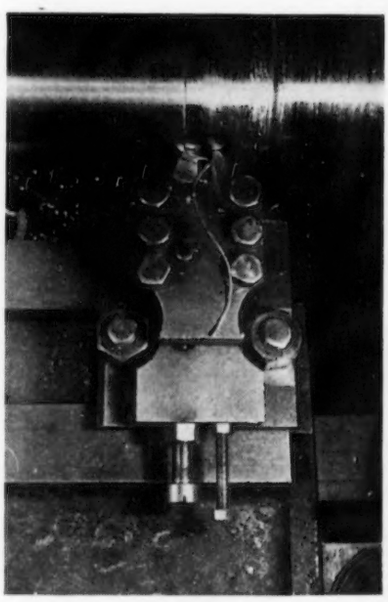


FIG. 2—A special tool-holder was employed for the lathe cutting tests.

$VM^{.116} =$ a constant ..... Feed 0.0033 in.
$VM^{.116} =$ a constant ..... Feed 0.0132 in.
$VM^{.100} =$ a constant ..... Feed 0.0284 in.
$V =$ cutting speed in ft. per min.
$M =$ tool life in minutes.

Cutting Speeds for Wrought Monel Metal Based on a Tool Life of 60 Min.*

METAL CUT

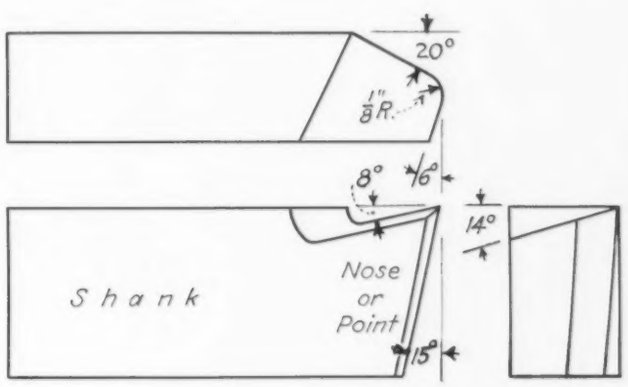
Nickel	66.5 per cent
Copper	31.0 per cent
Carbon	0.12 per cent
Treatment	Forged
Tensile	95,000 lb. per sq. in.
Yield Point	78,000 lb. per sq. in.
Elongation in 2 in.	23 per cent
Reduction in Area	56 per cent
Brinell	207-224

TOOL (pictured below)

Material	18-4-1 H.S.S.
Nose Radius	1/8 in.
Side Cutting Edge Angle	20 deg.
End Cutting Edge Angle	6 deg.
Side Rake	14 deg.
Back Rake	8 deg.
Relief	6 deg.

Feed In. per Rev.	0.002	0.004	0.008	1/64	1/32	1/16	1/8
Depth of Cut	Cutting Speed	Cutting Speed	Cutting Speed	Cutting Speed	Cutting Speed	Cutting Speed	Cutting Speed
1/32	262	209	168	139	118	104	69
1/16	223	179	144	121	104	60	48
1/8	205	163	138	110	68	48	34
1/4	192	153	124	103	57	39	29
3/8	190	149	121	98	52	34	24
1/2	186	147	118	95	49	31	21
5/8	185	147	116	93	47	29	18
3/4	183	145	114	92	45	26	17
1	182	144	113	90	43	25	14

* These calculations, based in part on the data in Mr. Matsen's article, are published by courtesy of the A. S. M. E. Special Research Committee on the Cutting of Metals.



Shape of lathe tool used in Matsen monel metal cutting experiments.

Using these approximate relations, VM^o was calculated for each test point. Using the values thus obtained for each single feed in one set, a tabulation was made according to their absolute position in the monel metal round, using half inches in diameter and approximate thirds of the log length as the headings. The values in each grouping were then averaged, and this average used as an indication of the machinability of the annular ring covered by the grouping. An average value for all points was obtained as a base point. This value divided by each annular ring average gives a factor which was used as a correction for the individual values. Each cutting speed multiplied by its appropriate correction factor for the ring in which it occurs gives a value on a basis as uniform as possible as far as the metal cut is concerned. Plotting the new values of cutting speed against tool life, a smoother curve is obtained than the one obtained from the preliminary values.

The follwing relationship is then found to hold:

$VM^{.122}$ = a constant for 0.0033 feed.
$VM^{.124}$ = a constant for 0.0132 feed.
$VM^{.153}$ = a constant for 0.0284 feed.

Figs. 3, 4 and 5 show the curves obtained after the correction factor has been applied to the cutting speeds.

The average of the first two exponents is 0.123. It appears that for feeds where the tool fails by nose abrasion the exponent is somewhere around 0.123, while for feeds where the tool fails by cratering the exponent is 0.153.

Several tests were conducted at different feeds and depths of cut. Table 2 shows the results of tests run at a 3/16 in. depth of cut and varying feeds, with a tool life of 8-10 min. Table 3 shows the results of tests run at a constant feed of 0.0033 in. and at varying depths of cut with cutting speeds such as to obtain tool life of 8-10 min.

In obtaining the relationships for variations in depth of cut and feed, each cut was reduced to length of engagement of tool with the work and the average chip thickness. According to R. C. Deale this method is much more fundamental than depth of cut and feed as used by previous investigators. The total length of engagement is the total length of engagement of the cutting edge of the tool bit with the Monel Metal round, as shown in Fig. 6. Table 4 gives the average chip thickness and length of engagement for several different cuts and feeds.

According to Mr. Deale the desired formula should have the form

$$V = \frac{K}{T^m \times L^{nT} \times M^o}$$

where V is the cutting speed in ft. per min., T the average thickness of the chip, L the total length of engagement, M the tool life in minutes, and K is a constant depending on the material cut. The value of "o" has been previously determined from the equation VM^o = a

TABLE 2—Results of Tests Run at Various Feeds, with a 3/16-in. Depth of Cut and a Tool Life of 8 to 10 Min.

Cutting Speed (Ft. per min.)	Tool Life (min.)	Feed (In. per rev.)	Depth of Cut (in.)
227	8.66	0.00474	3/16
73	7.05	0.0464	3/16
225	9.46	0.00474	3/16
223	8.75	0.0033	3/16
103	7.83	0.0264	3/16
105	10.25	0.0284	3/16
162	8.30	0.0132	3,16
151	10.88	0.0132	3/16

TABLE 3—Results of Tests Run at Various Depths of Cut and a Constant Feed

Cutting Speed (Ft. per min.)	Tool Life (min.)	Feed (In. per rev.)	Depth of Cut (in.)
276	10.38	0.0033	1/16
250	11.66	0.0033	1/8
251	12.20	0.0033	1/8
220	7.91	0.0033	1/4
218	8.50	0.0033	1/4
205	13.18	0.0033	5/16
210	11.08	0.0033	5/16
300	8.02	0.0033	1/32
201	10.08	0.0033	3/8
200	9.62	0.0033	7/16

TABLE 4—Average Chip Thickness and Length of Engagement for Different Cuts and Feeds

Depth of Cut	Feed	Length of Engagement	Average Chip Thickness
1/32	0.0033	0.091	0.001131
1/16	0.0033	0.133	0.00155
1/8	0.0033	0.202	0.00204
3/16	0.0033	0.268	0.00230
1/4	0.0033	0.334	0.00247
5/16	0.0033	0.401	0.00257
3/8	0.0033	0.467	0.00265
7/16	0.0033	0.523	0.00276
3/16	0.00474	0.269	0.00330
3/16	0.0132	0.273	0.00908
3/16	0.0284	0.281	0.01895
3/16	0.0464	0.292	0.02970

TABLE 5—Average Power and Value of "K" for Three Different Feeds at 3/16-in. Depth of Cut

Feed (in. per rev.)	Depth of Cut	Cutting Speed (ft. per min.)	Power (k.w.)	Value of "K"
0.0033	3/16	295	1.80	9.85
0.0033	3/16	298	1.82	9.98
0.0033	3/16	300	1.75	9.45
0.0033	3/16	296	1.74	9.50
0.0033	3/16	225	1.30	9.34
0.0033	3/16	237	1.38	9.42
0.0033	3/16	246	1.30	8.54
0.0033	3/16	251	1.39	8.96
0.0033	3/16	239	1.38	9.35
0.0033	3/16	236	1.31	8.98
0.0033	3/16	232	1.32	9.20
0.0033	3/16	286	1.62	9.15
0.0033	3/16	302	1.79	9.60
0.0033	3/16	305	1.72	9.14
0.0033	3/16	302	1.98	10.60
0.0033	3/16	261	1.49	9.24
0.0033	3/16	256	1.42	8.97
0.0033	3/16	254	1.52	9.68
0.0033	3/16	260	1.39	8.64
0.0033	3/16	256	1.65	10.40
0.0033	3/16	222	1.22	8.90
0.0033	3/16	223	1.10	7.98
0.0033	3/16	216	1.28	9.60
0.0033	3/16	222	1.30	9.47
0.0033	3/16	222	1.33	9.72
0.0033	3/16	232	1.21	8.44
0.0033	3/16	206	1.19	9.35
0.0033	3/16	209	1.22	9.45
0.0033	3/16	208	1.16	9.02
0.0033	3/16	212	1.26	9.60
0.0033	3/16	210	1.34	10.30
0.0033	3/16	201	1.21	9.74
0.0033	3/16	237	1.20	8.19
0.0033	3/16	241	1.52	10.20
0.0033	3/16	242	1.32	8.82
0.0033	3/16	213	1.34	10.20
0.0033	3/16	213	1.16	8.80
0.0033	3/16	214	1.22	9.20
0.0284	3/16	135	4.91	6.85
0.0284	3/16	127	4.72	6.99
0.0284	3/16	122	4.29	6.60
0.0284	3/16	118	4.38	6.98
0.0284	3/16	118	4.36	6.94
0.0284	3/16	115	4.29	7.00
0.0284	3/16	107	3.96	6.95
0.0284	3/16	107	3.90	6.84
0.0284	3/16	107	4.02	7.05
0.0284	3/16	105	3.70	6.60
0.0284	3/16	104	3.63	6.55
0.0284	3/16	105	4.10	7.34
0.0284	3/16	103	3.89	7.10
0.0284	3/16	100	3.55	6.66
0.0284	3/16	112	4.28	7.17
0.0284	3/16	105	3.80	6.80
0.0284	3/16	96	3.41	6.65
0.0132	3/16	162	3.12	7.80
0.0132	3/16	162	3.02	7.55
0.0132	3/16	162	3.15	7.86
0.0132	3/16	151	2.82	7.57
0.0132	3/16	177	3.30	7.55
0.0132	3/16	176	3.40	7.82
0.0132	3/16	174	3.37	7.85
0.0132	3/16	175	3.63	8.40
0.0132	3/16	151	2.71	7.36
0.0132	3/16	153	3.01	7.97
0.0132	3/16	153	2.86	7.57

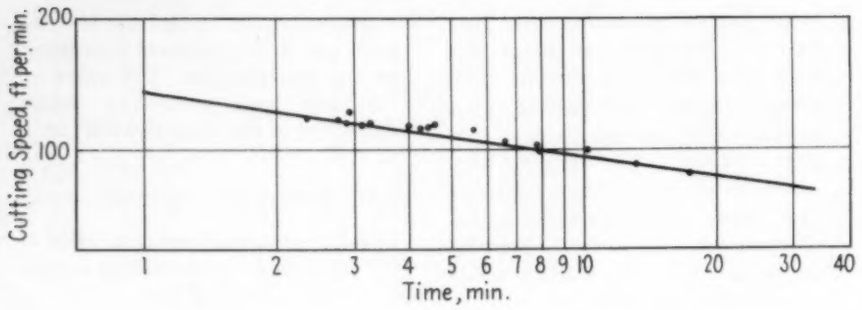


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FIG. 3—Effect of speed on tool life. Feed, 0.0284; depth of cut, 3/16 in.; and C-VM.[153].

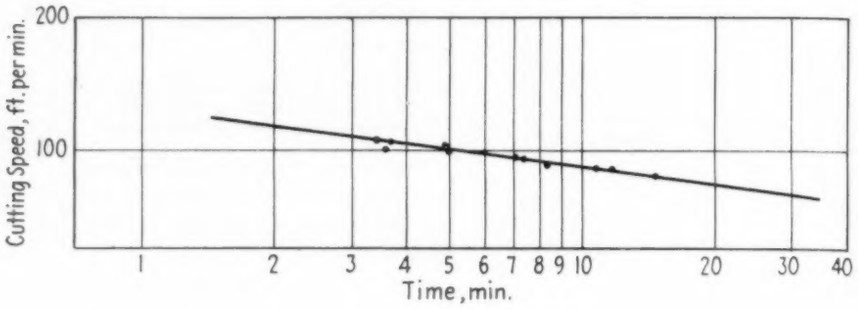

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FIG. 4—Effect of speed on tool life. Feed, 0.0132; depth of cut, 3/16 in.; and C-VM.[124].

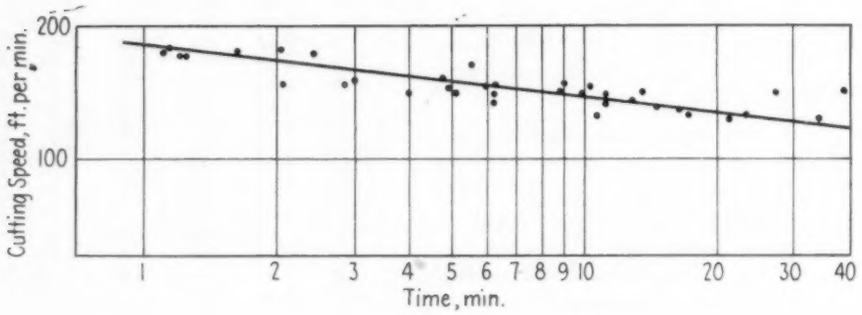

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FIG. 5—Effect of speed on tool life. Feed, 0.0033, depth of cut, 3/16 in. and C-VM.[122].

constant. Therefore it remains to obtain the value of m, n and K.

By the method of least squares the following relation is found:

$$V = \frac{5.70}{T^{.76} \times L^{6T} \times M^{.153}}$$

= cutting speed for a tool life of M minutes.

This formula applies where the chip thickness is greater than 0.015 in.

For cuts with a chip thickness less than 0.015 in. the formula is:

$$V = \frac{37.7}{T^{.34} \times L^{6T} \times M^{.122}}$$

The above relations were obtained with the aid of information from the tests on forged and cast Monel Metal conducted by the International Nickel Co., Inc. It appears, then, that there is a double relationship, but whether such a relationship actually exists cannot be verified by the present data since the author was unable to run a sufficient number of tests at the heavier feeds.

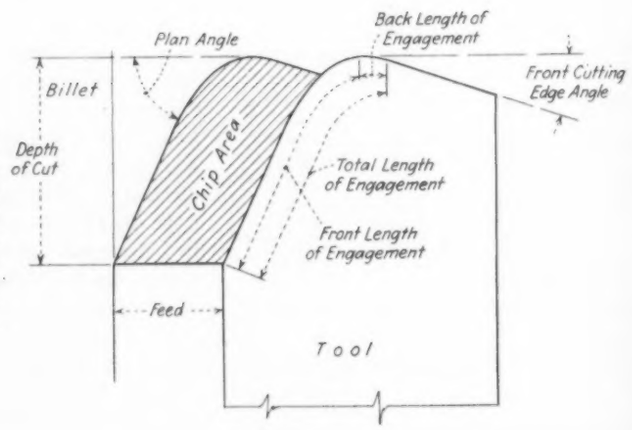

FIG. 6—For obtaining the relationships for variations in depth of cut and feed, each cut was reduced to length of engagement of tool with the work and the average chip thickness.

Power Measurements

Power measurements were taken for nearly all tests by reading the ammeter and a voltmeter placed in the power circuit. The average product of the voltmeter and ammeter readings gives the power required to turn the Monel Metal test piece plus that required for cutting. Voltmeter and ammeter readings were taken before and after the actual cutting in each test; the average product of the two subtracted from the product of voltmeter and ammeter readings taken

while the tool was cutting, gives the net power approximately for cutting.

An approximate equation for the power required may be written as follows:

$P = K\ F\ D\ S$, where P = power in kw.; F = feed in inches; D = depth of cut in inches; S = cutting speed in ft. per min., and K = a constant depending on the material cut.

The value of K is obtained by substituting in the equation values for P, F, D, and S as used in the test. Table 5 gives the average power and value of K for three different feeds at a 3/16-in. depth.

The maximum, minimum and average values of K are:

Feed	Depth of Cut	Max. K	Min. K	Average K
0.0033	3/16 in.	10.60	8.19	8.54
0.0132	3/16 in.	8.40	7.96	7.75
0.0284	3/16 in.	7.34	6.55	6.88

The average value of K for all feeds = 7.72.

The equation $P = 7.72 \times F \times D \times S$ will give the approximate power only in the lathe cutting of monel metal and for the particular shape of tool used.

In Fig. 7 power is plotted against cutting speed for three different feeds. Insufficient data makes it impossible to plot power against cutting speed for different depths of cut. It is apparent of course that before any definite conclusions can be made as to the power required in the cutting of Monel Metal more data must be made available. For example, the maximum momentary power demand was not considered here, although it is a quantity that is used in power transmission problems. However, the data obtained for the three different depths of cut gives at least some practical information on the power required.

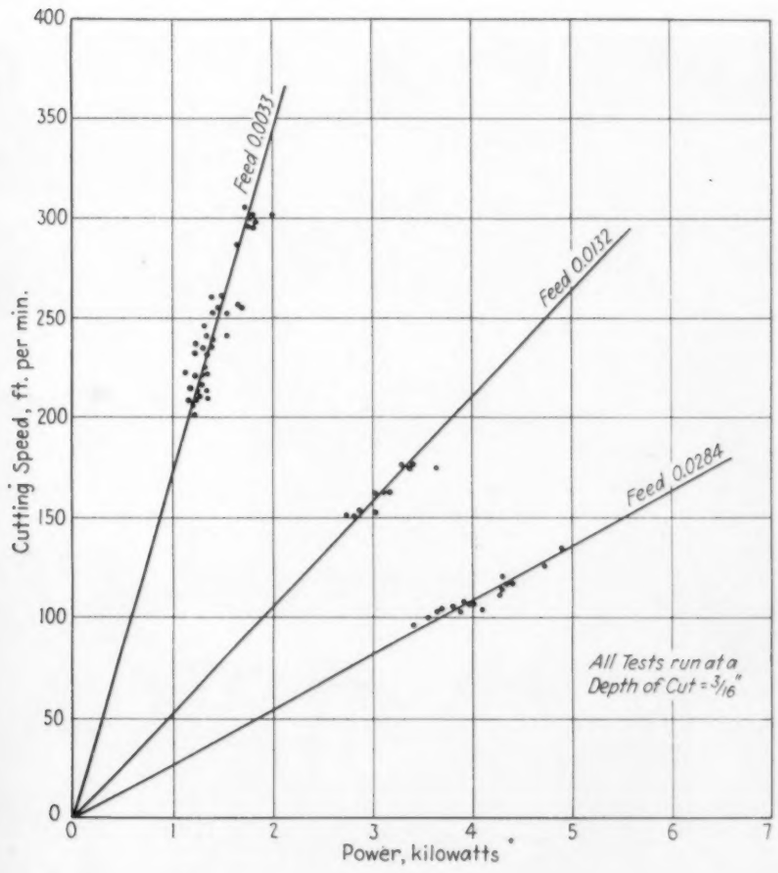

FIG. 7—Power plotted against cutting speed for three different feeds.

Cutting Speeds for Wrought Monel Metal*
Based on a Tool Life of 60 Min.

METAL CUT

Nickel	66.5 per cent
Copper	31.0 per cent
Carbon	0.12 per cent
Treatment	Forged
Tensile	95,000 lb. per sq. in.
Yield Point	78,000 lb. per sq. in.
Elongation in 2 in.	23 per cent
Reduction in Area	56 per cent
Brinell	207-224

TOOL

Material	18-4-1 H.S.S.
Nose Radius	1/8 in.
Side Cutting Edge Angle	20 deg.
End Cutting Edge Angle	6 deg.
Side Rake	14 deg.
Back Rake	8 deg.
Relief	6 deg.

Feed In. per Rev. Depth of Cut	0.002 Cutting Speed	0.004 Cutting Speed	0.008 Cutting Speed	1/32 Cutting Speed	1/16 Cutting Speed	1/8 Cutting Speed	1/4 Cutting Speed
1/32	262	209	168	139	118	104	69
1/16	223	179	144	121	104	60	48
1/8	205	163	138	110	68	48	34
1/4	192	153	124	103	57	39	29
3/8	190	149	121	98	52	34	24
1/2	186	147	118	95	49	31	21
5/8	185	147	116	93	47	29	18
3/4	183	145	114	92	45	26	17
1	182	144	113	90	43	25	14

*These calculations, based in part on the data in Mr. Matsen's article, are published by courtesy of the A.S.M.E. Special Research Committee on the Cutting of Metals. This table has been enlarged on the accompanying insert for the convenience of readers that might desire to preserve it for permanent use.

The author wishes to acknowlege the generous assistance of R. C. Deale, and also of Dr. Eric Therkelsen and Prof. Fred Homann of Montana State College. The author is indebted to the International Nickel Co., New York, for contributing the hot forged Monel Metal rounds for the tests and to the Brown & Sharpe Mfg. Co., Providence, R. I., for the heat treatment of the tool bits.

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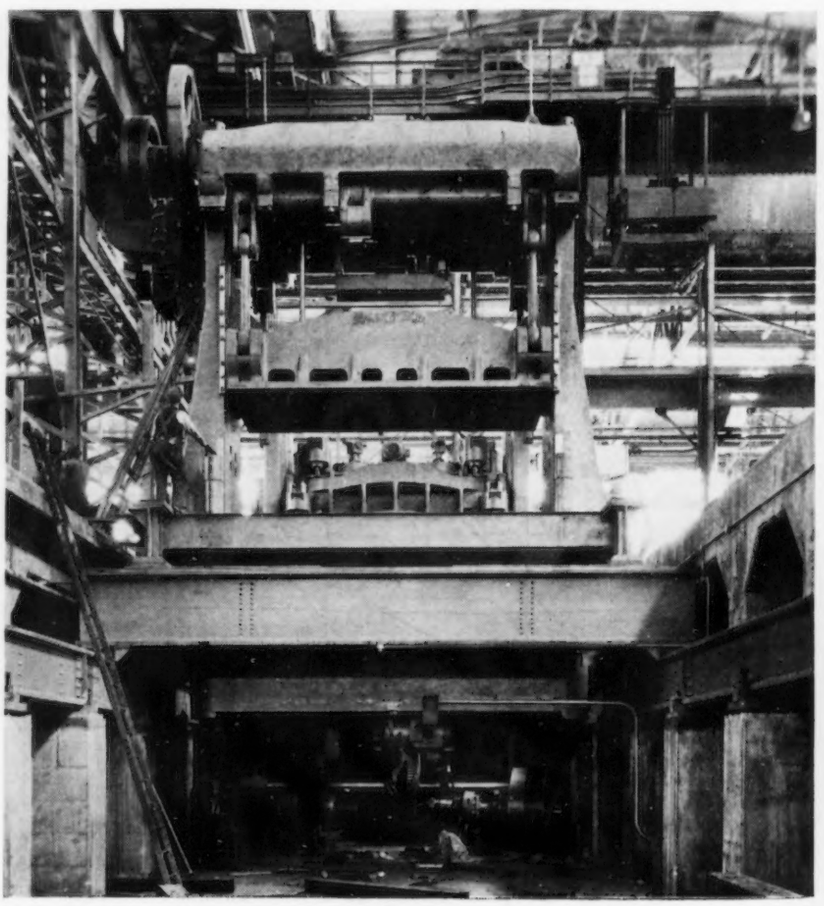
Flexibility in Press

IN fast moving industry like the automotive, flexibility in layout is essential in almost all operations to accommodate process variations attendant upon yearly design changes. In a body plant, for example, it is not uncommon to shift conveyor lines, welding machines and fixtures as often as once a year. Stamping operations are carried on also in progressive lines and it is equally desirable to be able to shift presses about to facilitate material flow from operation to operation. Shapes vary, number and sequence of operations vary. The steady increase in the size and weight of body presses has made the problem no simpler, with unit weights running up to 500 tons. Heretofore, the practice has been to make individual foundation pits for these monsters. Some have been dug 50 ft. to bedrock. Often one-third the press is below the floor level, but unlike a forging hammer, movable machinery, such as pneumatic cushion beds, is in the base to which access must be had. The weight must be carried from the press shoes to the ground through concrete columns outside the pit to a cap usually resting on piles.

Once such pits are located in the shop floor, there is no incentive great enough to warrant changing them. Yet a shift of a few feet between machines may greatly facilitate handling of stampings between operations.

To provide just such flexibility, the construction engineering department of the Fisher Body Corp. resorted to an original type of overall press pit for the new General Motors stamping plant now getting into operation at Grand Rapids. Before describing the details of the solution of the problem, the general layout will be reviewed. The press shop is designed to produce 2000 sets of body stampings daily. It has five bays 75 ft. wide by 260 ft. long for the longer sections of a roughly C-shaped structure. In each bay are two production lines of presses, making ten in all. Of the large equipment, there are five 500-ton presses, seven 300-ton and twenty 200-ton units. There are six presses in full line. The largest presses used to make Fisher Body steel "turret tops" weigh approximately 970,000 lb. apiece and carry dies weighing 140,000 lb. Impact load is figured at 500,000 lb. additional. The arrangement is such that any one of



Layout

o o o

By FRANK J. OLIVER
Detroit Editor, The Iron Age

o o o

these big fellows can be spotted anywhere in the 154,000 sq. ft. of floor space, within certain broad limits.

In brief, a network of steel girders or cribs has been constructed within a monolithic waterproof concrete pit or boat. Over 2000 tons of steel went into the press foundations alone, exclusive of any of the superstructure. The concrete pit has some unusual points of interest. It is 16 ft. 6 in. deep from the floor level, has a bottom 4 ft. thick resting on piles driven at 5 ft. 6 in. centers in both directions. In fact the entire building, including die shop, metal shop and power plant, rests on over 6000 piles. The walls of the pit taper from 24 in. at the base to 12 in. at the top. To make the whole structure a single monolithic unit, the pit was poured continuously, day and night, at the rate of a cubic yard a minute until some 7000 yards had been poured. For waterproofing, a membrane of asphalt tar and pitch was first laid down. It is flexible enough to stretch should any cracks develop from press vibrations.

As has been indicated, in each of the five bays there are two longitudinal pits running the full length

(CONTINUED ON PAGE 121)

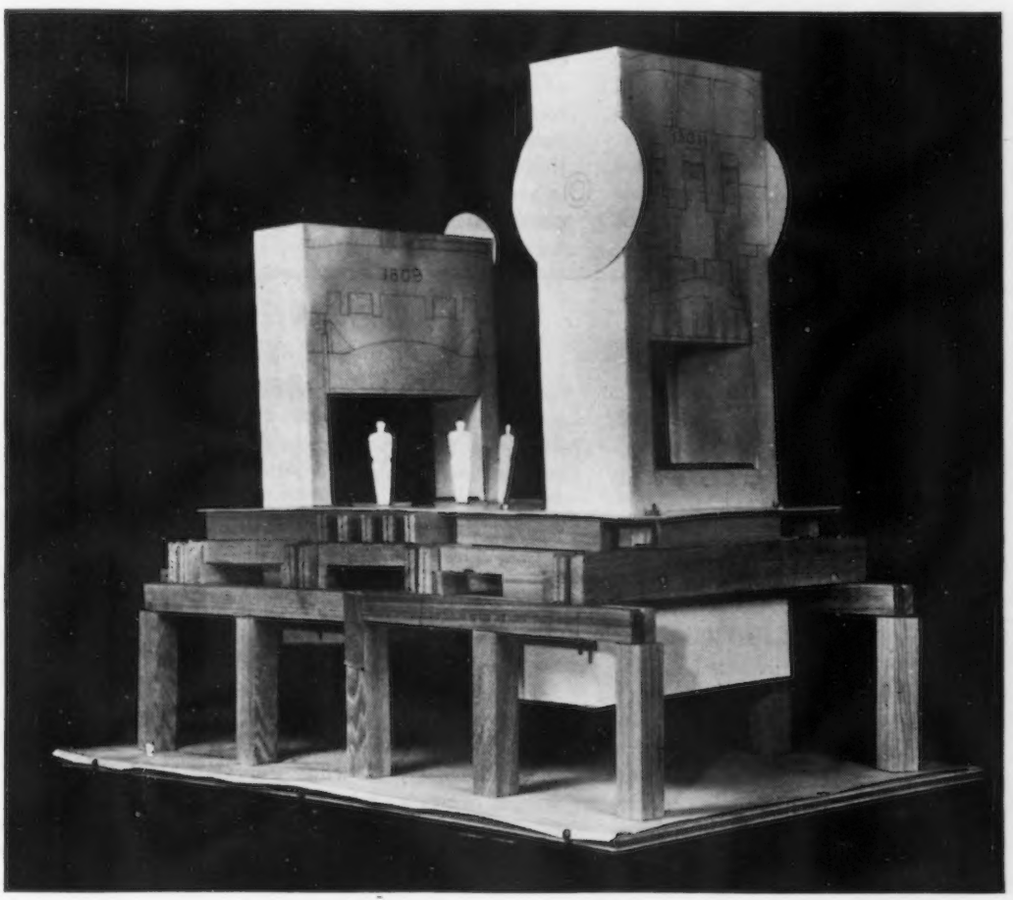
AT LEFT

WORM'S eye view of one of the press pits showing longitudinal rails supported on concrete pillars and 36-in. cross girders. Press weight 490 tons.

o o o

AT RIGHT

MODELS of wood and paper help engineering decisions when unconventional designs involving large expenditures are being considered. This model shows the steel cribbing for presses at General Motors new stamping plant at Grand Rapids.



Evaluating Shop Jobs

By the Point S

WAGE rates in industry present two distinct problems. The first concerns management and consists of the adoption of a general wage scale based on costs and wage rates within its district. The second concerns the industrial engineer and consists of determining the relative value among jobs, or the relative position of various jobs within the wage scale adopted by the management. It is the second, or job evaluation, that is the subject of this accompanying article.

The necessity of rating jobs lies in maintaining a balanced labor market and in being able more confidently to justify to individual workers the various differentials in wage rates, the latter now more necessary, perhaps, than ever. An analytical method of rating, by the point system, is here outlined by Mr. Bass. Actual application of this system will be discussed in a second article in a forthcoming issue.

DO your shop men ever question the equity of your rate differentials? If so, do you have to refer to district rates or general comparisons for your justification? For years that is what we, along with most other industries, have had to do.

Let us take a case to illustrate:

Mike Puloski is dissatisfied with his hourly rate. Now Mike is no intellectual giant, but he is a fairly rational human being. He is not primarily interested in the company's general wage scale, and he knows little about price indexes and district rates. What he does know is that his job requires certain skill and involves certain definite responsibility, and on that basis, he feels it is underrated in comparison with other jobs in his own department. His complaint is not generally with any absolute rate, but rather is based upon what his job is paid in relation to others.

So we go down to talk with him, and are invariably greeted with the question "Where in the h—l did you get this rate?" This involves a long explanation of how different jobs have been fitted into the wage scale in what judgment would indicate was their proper relative importance. Mike, however, feels that as a result of his closer perspective to the work, his judgment is just as good as ours and his judgment indicates that we are wrong.

We ask Mike to pick out the job with which he feels his should be compared, and we sit down to discuss it with him.

"To start with Mike, let's consider the mental requirements of your job. You have to study your drawings and figure out your setups, and layout your work and calculate some angles, but is this as difficult on your job as on the other?"

"Well, no, not quite," he may answer.

"Very well," we reply. "You also need a considerable amount of manual skill, that is, you need an accurate sense of touch and you can't be all thumbs, but does your job require as much of this kind of skill as the other?"

"It requires an awful lot more."

"That is reasonable," we may reply, "but does it involve as much responsibility?"

"No, but look at the working conditions, I would rather have that other job any time."

If we have approached him in a spirit of open mindedness, he will in all probability assume the same attitude toward us, and in that case, his answers will pretty generally agree with our own appraisal.

So, here we are in agreement on certain of those fundamental qualities which in themselves justify

System . . .

By A. W. BASS, Jr.

Industrial Engineer, South Philadelphia Works, Westinghouse Electric & Mfg. Co.

Blading a turbine rotor

differentials in job values, and yet, we are no closer to an agreement as to the total relative values of the two jobs. We cannot categorically say that we are right, for we have only our judgment to guide us, and while it may be a little more accurate than Mike's, it is far from infallible.

Point System a Yardstick

The sole reason for our continued failure to agree rests upon the simple fact of our having no means of measuring the proportion of the job's value that was represented by this lower degree of mental requirements, this lot more skill, and this variance in responsibility and working conditions. If we had had a yardstick to set-up beside these qualities, so that it was possible in every case to measure the number of inches difference, the algebraic total of all those pluses and minuses would represent the difference in value between the jobs. When we do this, we have what is commonly known as a point system for the evaluation of jobs.

This is not strikingly new. For a number of years it has been used in different forms and with varying degrees of success in a limited number of businesses. Probably, the reason for its not more general adoption is due partly to the lack of publicity given it, and partly to the lack of uniformity of its success.

Failure Lies In Approach

However, where its application has not been satisfactory, it is reasonable to assume that the failure rests in the approach made to setting up the system, rather than the fundamental theory of the system itself. For job evaluation is nothing more than subjecting the wage element of cost to the same analysis that for years we have subjected the time element. The micro-motion camera has been used to measure seconds, and yet, wage rates have been predicated upon little more than general comparisons.

With respect to wage rates, industry has two distinct problems. The first belongs to management, and consists of the adoption of a general wage scale, which must be compatible with costs and with labor rates within its own district. The second belongs definitely to the industrial engineer. It consists of a determination of relative value among jobs, or what is the same thing, of their relative position within the wage scale.

In this second problem, the industrial engineer's most valuable instrument can be a well thought out and carefully applied method of job evaluation. This method should not be construed, however, as a means of miraculously determining the absolute economic value of any given job. In my opinion, it should not bear any relation at all to hourly rates, until the relative position values are applied to the adopted wage scale, and this scale can be anything.

Moreover, it is wrong to consider this approach to the determination of relative job values as scientific, for that implies something which

possesses the accuracy of mathematics. By whatever means the positions of jobs in a rate structure are determined, comparative judgment must be used in the last analysis to determine the differentials. Now, wherever a problem must be referred to judgment, the accuracy of this mental appraisal will be contingent upon the number of factors which must be mentally weighed and considered. So, if we can segregate these factors, as we do in this method of job evaluation, and consider them separately, our problem of applying judgment will be much more sharply focused, and possible errors will be considerably minimized.

Real Need for Accurate Job Rating

The need of industry as a whole for a more accurate rating of jobs is very real—not, however, from the standpoint of cost reduction, for this does not necessarily follow. The needs that are important, are for:

1.—Maintaining a balanced labor market, and

2.—Being able to more confidently justify differentials in wage rates.

For industry as a whole to pay more for a given occupation than it is worth in relation to other jobs is to attract a disproportionate volume of labor to that trade with the eventual and inevitable result of a generally unbalanced labor supply.

The ability to rationally justify rate differentials is going to become more necessary from now on. The day when a foreman could categorically state that a rate was right and let it go at that is past. Labor is going to demand more and more a reasonable accounting for rate differences, and industry must be in a position to give them something other than mere opinion. This is apt to be brought even more to the forefront by the rapidly emerging vertical union. With union activity confined largely to the crafts, this problem does not exist, but with the industrial or vertical union, which embraces the sweeper as well as the toolmaker, the problem not only will exist but will unquestionably be made a point of discussion.

Selection of Factors to Measure

The ultimate success or failure of any attempt to rationalize job values lies to a large degree in the proper segregation for measurement of those factors which create wage differentials.

Obviously, if any factors are omitted from measurement, jobs which derive their principal value from this source would be heavily undervalued. If the attempt be made to measure specific qualities of a certain job or trade, the number of these qualities that will of necessity have to be measured when the evaluation scheme embraces a wide range of different jobs, becomes legion. In order to make the plan as simple as possible and eliminate the danger of overlooking any contributing qualities, I am of the belief that the only proper approach is along the lines of those qualities which are of a fundamental and general nature. While this does not relate the measurement to factors as specific and concrete as might be otherwise, it does eliminate the dangers of complexity and disproportionate evaluation that I have already pointed out.

In this plan, the approach to a selection of factors is along the line of fundamental principles. Very broadly speaking, it is felt that there are only three elements contributing to job values. These are:

1.—Skill.

2.—Personal Characteristics.

3.—Working Conditions.

To make no further subdivision of these factors would give us a much less analytical approach to the problem than that which we originally set out to make. It is necessary, therefore, to review these three elements with a view to any further possible breakdown which will still embrace fundamental qualities.

1.—SKILL

Skill in its broad interpretation is knowledge of a subject combined with mastery of its technique. Such skill, however, must presuppose a certain inherent intelligence. As a job becomes more complex, and as its administration becomes more dependent upon reasoning, and less upon acquired motor skills, the intelligence needed to perform it becomes increasingly greater.

A.—Intelligence, therefore, is a fundamental and general factor which should be measured separately.

Two other general and fundamental elements of skill immediately become apparent, namely:

B.—Knowledge of facts, and

C.—Whatever acquired motor skills are necessary.

These, therefore, together with intelligence constitute the major part of all skill.

Under the factor of knowledge must be considered all knowledge required whether of an academic or a specific nature, and under motor or manual skill, the degree of this type of skill needed.

There is one other element it is wise to measure under skill, and this is:

D.—Learning time.

While this obviously is redundant to knowledge and manual skill, it is desirable for two reason: First, it permits remeasuring from a more objective viewpoint these two important factors of acquired skill. Second, it permits measuring experience, which is not covered by any other factor. There are jobs requiring many years of experience to master, yet, in which these additional years do not add appreciably to either knowledge or manual skill. By measuring learning time, it is possible to compensate for this extended experience.

The detailed factors selected to measure SKILL are then:

A.—Intelligence, or Mental Requirements.

B.—Knowledge Required.

C.—Motor or Manual Skill, and

D.—Learning Time.

2.—PERSONAL CHARACTERISTICS

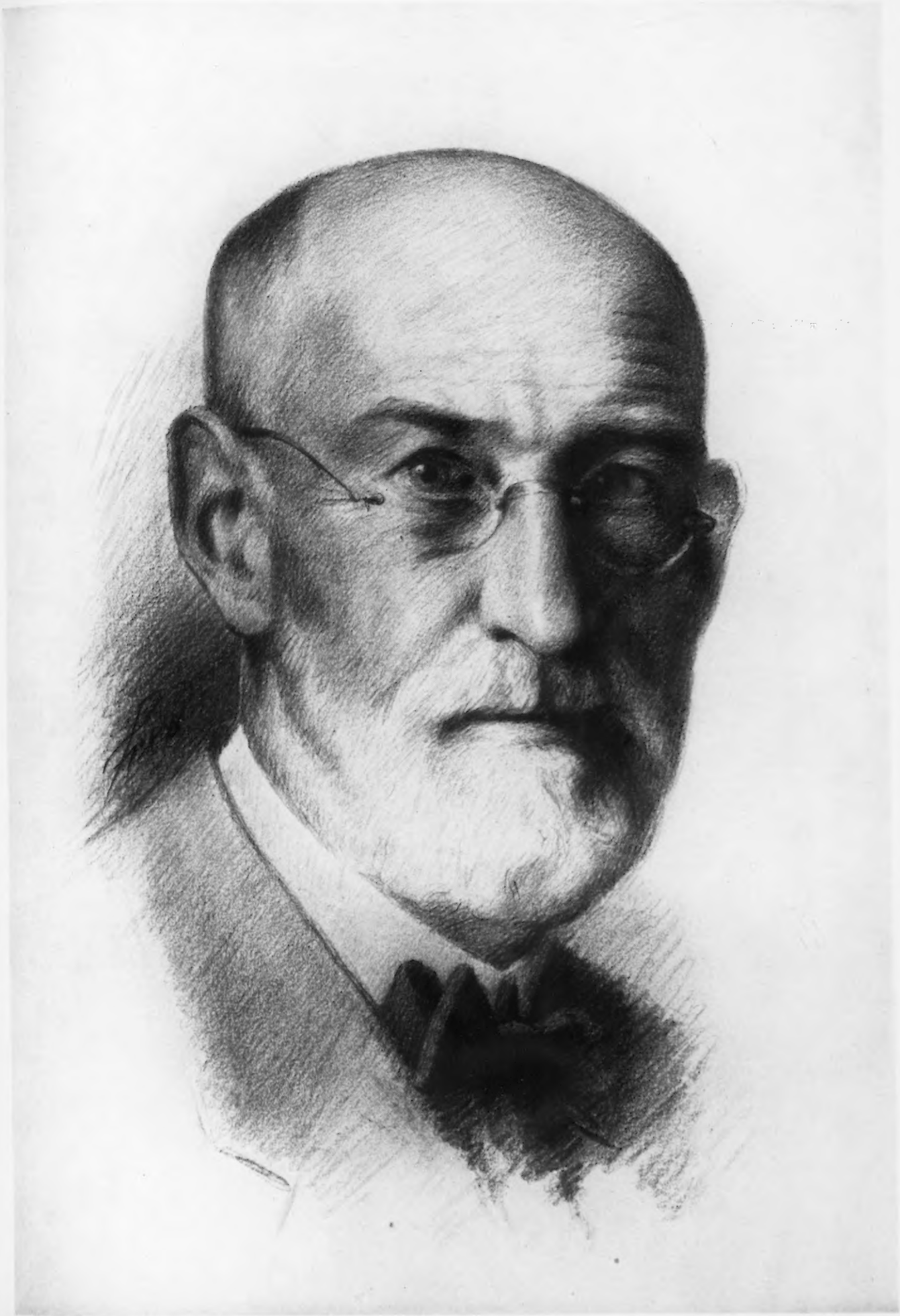
Considering personal characteristics, there are again several different types, but only one which it is necessary to consider. This is, that characteristic of caution, carefulness, or accuracy, the possession of which enables an individual safely to assume responsibility. Since the value of this factor is contingent upon responsibility, it will be called responsibility and measured as such.

3.—WORKING CONDITIONS

Consideration of working conditions brings to light one fundamental division that can be made. This is between the

A.—Personal application which is required in some degree in every job, and the

B.—Hazards or undesirable conditions of an occupational nature that are only present in occasional jobs.



W. A. VIALL, Vice-President, Brown & Sharpe Mfg. Co. Drawn by John Frew for The Iron Age.

UNIV. OF MICH.

Again, personal application is subject to a logical division. This is, on the one hand:

a.—That physical fatigue which results from heavy or laborious work, and on the other

b.—Nervous fatigue, which results from close or continuous concentration of the senses.

Occupational working conditions can, of course, be separated if desired, according to their character. Therefore, under the general element of WORKING CONDITIONS, we measure:

A.—Application (a) physical and (b) nervous; B.—Occupational Working Conditions, (a) Hazards, (b) Heat, (c) Dust, etc.

Measurement factors such as those enumerated are of such a general nature as to be applicable to any industry, be it textile, metal manufacturing, cabinet making, or processing. It might appear as though it were a mistake to make the scheme so general, and as though it would be better to make it specific to the plant or industry involved. If that were possible, it probably would be; but where the one plan must evaluate several totally different types of job within the one plant, it must be of such a general nature that it automatically becomes applicable to any type of job in any industry.

Construction of Rating Scales

Having decided to what factors we can logically apply a measure, the next step becomes that of deciding how this measure is to be applied. The final object of any plan of job rating, job classification, or job evaluation should be a determination of relative job value by comparison of each job to all other jobs. Therefore, the final form that job evaluation takes, is one of rating scales. In other words, a sufficient number of representative jobs are ranked, or listed in the order of their degree under each factor. These jobs should cover the range of the portion of the wage scale subject to evaluation, and contain as many intermediate examples as are necessary to give a complete picture of the relationship of jobs in the case of each factor.

When this has been done, the evaluation of any additional job becomes purely a matter of fitting it into these key rating scales in what would appear to be its proper location relative to jobs already ranked.

Weighting of Factors Necessary

There are three definite advantages to applying point weightings to the factors, and using points in making the evaluation.

In the first place, the mere ranking of jobs under each factor contains no significance until these rankings are in some way measured and some abstract measure obtained which will express the value of jobs in their mutual relationship. The obvious advantage of a detailed analysis is lost if there be no method of measuring the results obtained.

Second, all the factors selected are not of equal importance in contributing to job value. However, by careful weighting, it is possible to represent these varying values, and reflect them in the final point value of the job.

Third, in using points, there always remains a concrete measurable record of the analysis made, and should the rating subsequently be questioned, the actual evaluation always remains and can readily be rechecked.

Just how much intelligence is worth in relation to learning time and all the other factors will always be a question. There is little objective measure for any of these weightings which must be established. However, good judgment can approximate their relative importance, and the subsequent evaluation of jobs whose value is in fairly general agreement will tend to uncover any serious errors.

Embodying a Geometric Progression in the Point Values

Theoretically, any wage structure should embody the mathematics of a geometric progression. This is true regardless of the method by which position ratings are made. For if there is a series of jobs in which the theoretical value of each succeeding job is worth a constant increment more than of that preceding it, the wages paid should also be successively more by the same increment.

By using a point method of evaluating jobs, the embodiment of such a curve in the wage structure becomes relatively simple. With relative point weightings assigned to the various factors, curves can be drawn on semi-log paper from a certain minimum value to the selected maximum value. This maximum value, of course, must be established for some known condition, and does not necessarily represent the limit to which the evaluation is to be carried. These maximums simply reflect the highest levels of responsibility, intelligence, etc., of the jobs under consideration when the relative weighting of the factors was made. As it takes only two points to determine a straight line, that is all we care about here. Any of these curves can be extended for any other jobs which would require ratings above the maximums previously established.

Selection of the starting point for each of these curves, introduces another consideration. The value of the lowest condition under each factor is not zero, for every job requires some learning time, if only a day or so, and every job requires some intelligence. Moreover, the geometric progression in the actual wage structure is started from zero, and not from the level of the minimum wage. Therefore, if the selected point value for the minimum condition under each factor is not sufficient to bring zero points out equal to zero cents per hour, when the points are eventually related to the wage scale, it is necessary to add sufficient points to this minimum in each case so that this condition will be met.* After curves are drawn from this new minimum, it is perfectly permissible to subtract this added number of points from all values taken from the curve. In doing this, we are only making the absolute starting point of our geometric progression of point values coincide with the absolute starting point of the natural geometric in our wage structure.

In order to get this geometric progression into our job rankings, we divide the curve into a suitable number of equal increments along the arithmetic ordinate. The point values taken from the curve at these various steps serve as classes or ratings to which all jobs are assigned. When the job rankings under each factor have been as-

(CONCLUDED ON PAGE 123)

*This should not be misconstrued as an attempt to fake figures. The actual rate that would result from an evaluation of the lowest class of labor would not be a living wage. The points added to the curves in this manner, represent the difference between this actual evaluated rate, and the rate industry has established as minimum in view of contemporary living standards.

Tool Engineering Society of Tool

o o o

By O. B. JONES

o o o

THE name "Tool Engineering" is so new it is difficult even for those devoting all their time to it, to specify exactly what it should or does include or to indicate its exact boundary lines. Yet many of the elements of tool engineering originated in antiquity, for certainly even before the Pharaohs of Egypt tooled the stones to build their world-famous sepulchers, tool engineering was old.

The designing and building of tools, and the planning of manufacturing processes had been an incidental function of general engineering for many years. The function received little attention, and required little attention, until interchangeable manufacturing became general.

It is impossible to conceive of interchangeability, that is, the making of thousands of identical details, without the assumption of near perfection in form and durability of tools. Nor is it possible to visualize the parts of a complicated assembly passing through a factory from machine to machine, and from process to process, in their various stages of manufacture from the ingot to the final assembly line, without also assuming the pre-existence of very careful planning.

In the fewest words, tool engineering is the devising of manufacturing processes, the orderly arranging of their sequence and the designing of all production equipment.

To vision the breadth and scope of tool engineering, one need but recall that each machine, and each device used in conjunction with a machine, or any device used by the hand of a workman in manufacturing process is a tool.

The development and spontaneous growth of mass manufacturing has had a profound effect upon nearly every phase of human existence today. The continued advancement of civilization will depend largely upon the advancements made in mass manufacturing. But continued development of mass manufacturing can only follow the development of tools.

Because of the growth of mass manufacturing and the consequent importance and immensity of the problems of tooling, they were inevitably divorced from general engineering and the new profession of tool engineering born.

Master mechanics, tool, die and machine designers, plant superintendents, and other engineers and executives with varied titles had been doing tool engineering nearly as long as it was possible without the benefits of an association which could coordinate their activities, assemble the information they needed and aid in the solution of their peculiar problems as the older societies have met the needs of their members.

Historians can usually throw a halo of romance around the events or natural actions of an individual or individuals instrumental in pioneering a movement or founding an empire. But it seems to those who founded the American Society of Tool Engineers that heroics had no part in its humble beginning. The time was at hand and the conditions were ideal, so no heroic efforts or sacrifices were necessary.

Indeed the simple circumstance, or prosaic situation, that really started the American Society of Tool Engineers was the "Hungering and thirsting after knowledge" of a group of students of the little Detroit College of Applied Science. They had been conducting a Tool Engineering Society for several years. Aside from considerations of good fellowship, its principal purpose was having experienced tool engineers bring practical information for presentation at their meetings.

This did not provide as close contact with tool engineers as the students needed, so O. B. Jones, president of the college, conceived the idea of reorganizing the student society into a national society for tool engineers.

He first discussed the idea with Ford R. Lamb, of the Consolidated Machine Tool Corp., who consented to attend a meeting provided one could be arranged with other tool engineers.

A week or so after this, around the middle of February, 1932, a small group was invited to meet at the college to discuss the idea. Those present were Frank E. Shailor, who was then a die design instructor at the college; Frank H. Hartlep, then chief tool designer for the Timken-Detroit Axle Co.; Guy E. Swartz, of the Swartz Tool Products Co.; Otto F. Poelke, then of the Cadillac Motor Car Co.; Ford R. Lamb and O. B. Jones.

Organization plans were worked out at subsequent meetings which were attended by additional tool engineers. On March 3, thirty-three tool enginers representing a cross-section of manufacturing in Detroit elected five of their number as officers to serve for a period of one year.

J. A. Siegel of the Packard Motor Car Co. was elected presi-

dent. W. H. Smila of the Chrysler Corp. was elected first vice-president, and Earl Ruggles of the Gemmer Mfg. Co. was elected second vice-president. The first secretary was A. M. Sargent of the Pioneer Engineering and Mfg. Co. Wm. J. Fors of the Stenger Die & Tool Co. was elected treasurer.

About three weeks after the election of officers, a first general meeting was held at Webster Hall in Detroit on the evening of March 23, for their installation. At this time the membership consisted of approximately 200 senior and junior members. The society was chartered under the laws of the State of Michigan as a non-profit corporation March 31, 1932.

One of the most impelling reasons for organizing the society was to keep tool engineers advised of what was taking place throughout the entire tool engineering field. That the young Society set about the accomplishment of this task with real speed is evidenced by the fact that 500 copies of a 24-page journal of the society were mailed to the membership and potential members the latter part of April—within 30 days of the date of its incorporation. It bore the May, 1932, date.

It was compiled, edited, and managed completely by a committee known as the "Publicity Committee." The "A.S.T.E. Journal" was published under F. R. Lamb's leadership until the May, 1933, issue when the chairmanship of the publicity committee was turned over to O. B. Jones, who was responsible for the publication of the Journal until the Feb., 1935, issue.

From that date to this, the official organ of the society has been published under the business management of the Bramson Publishing Co. and editorially supervised by the committees appointed by the Society president. At the time the publication was turned over to the Bramson Publishing Co., its name was changed from "A.S.T.E. Journal" to "The Tool Engineer." The January, 1936, issue of *The Tool Engineer* had a circulation of more than 5000 copies.

and *The American Engineers* . . . .

Chapters

As master mechanics, tool supervisors, operation planners, time study men, tool, die and machine designers, and other manufacturing executives who appreciated the importance of tooling, learned that those of kindred occupations had organized a society in Detroit, they became members-at-large. As this membership grew in certain localities, requests were sent in to Detroit for charters to operate chapters.

Much of the preliminary detail work, as well as the actual field work, incident to chapter organization, was done by Roy T. Bramson, who is at present in charge of this phase of the society's growth, as chairman of the New Chapters Committee.

Details of chapter organization were worked out so that where 25 members were so grouped as to make their meetings possible, charters were granted. The first chapter outside of Detroit was chartered Oct. 21, 1935, at Racine, Wis. A chapter at Cleveland was chartered Dec. 3, 1935, and one at Milwaukee, April 2, 1936.

At the present time negotiations are under way for the chartering of nine additional chapters.

The first student chapter was chartered at the Detroit College of Applied Science, May 5, 1936.

Standardization

One of the principal functions of the society is the assembling of information pertaining to tool engineering and passing it on to its members for permanent record. The committee which performs this function is the "Standardization Committee." This committee was organized in September, 1932, with E. C. Lee, chief tool designer of the Jefferson Avenue plant of the Chrysler Corp., as chairman. He was succeeded at the end of his year's term by F. H. Hartlep, who in turn was succeeded by W. H. Smila, who is the present incumbent.

The function of the Standardization Committee at the present time is not one of standardizing but the *assembling* of all information pertaining to processes, methods, machinery, machine attachments, perishable tools and dies and so on, making it available for instant use of each individual member. This committee has recently perfected a method of collecting, presenting, and preserving this information and has distributed fifteen issues to the membership to date. It is intended that one or more issues will be mailed to members each month until the entire field is covered.

Control and Membership

The control of the society is vested in a national non-salaried board of directors, consisting of 33 members, elected by direct vote of the general membership. The national officers are elected annually by the board of directors and also render their services gratis. The only salaried employee is an assistant national secretary. It is partly due to this condition of voluntary service that membership dues are so low that practically anyone can become a members of this society who is engaged in tooling the mass manufacturing plants which provide for the necessities and luxuries essential to modern living.

Isolating Vibrations se
Power h

By ERNEST B. ALLEN

Consulting Engineer, Boston

SEVERAL cases have come up recently in the vicinity of Boston where shops employing power or drop hammers have been legally enjoined from operating these tools because of the severity of the vibrations set up. An interesting point is that it has been possible to isolate these vibrations by very simple and economical means and thus get the injunctions removed. An important fact which experience has brought to light is that in sections where there are dwellings it is safest to take care of isolating the vibrations at the time that the machinery is installed, as it can be done at that time for only a small percentage increase in cost, whereas if the work is done as a remedy it means reconstructing the foundations, plus legal expenses.

One of the most interesting correctional jobs of this kind was at the plant of the Porter Forge & Furnace Co., Inc., at Everett, Mass. When this company moved to its new location it installed, among other machines, a 2200-lb. drop hammer. The vibrations from this were so severe that the residents of the neighborhood obtained an injunction against its use. Tests made with a portable seismograph revealed vertical vibrations of great amplitude, as shown in Fig. 1.

As the distance transmitted and disagreeable effects of such vibrations depend, with a drop hammer, on their amplitude, the frequency of drop hammers not being sufficient to constitute a factor, the thing to do was to install an absorbing mat in such a manner as

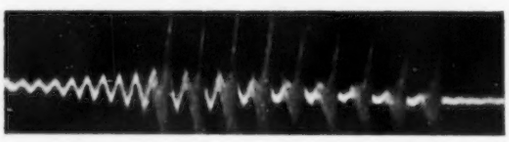


FIG. 1—Record of vertical vibrations before isolating a drop hammer.

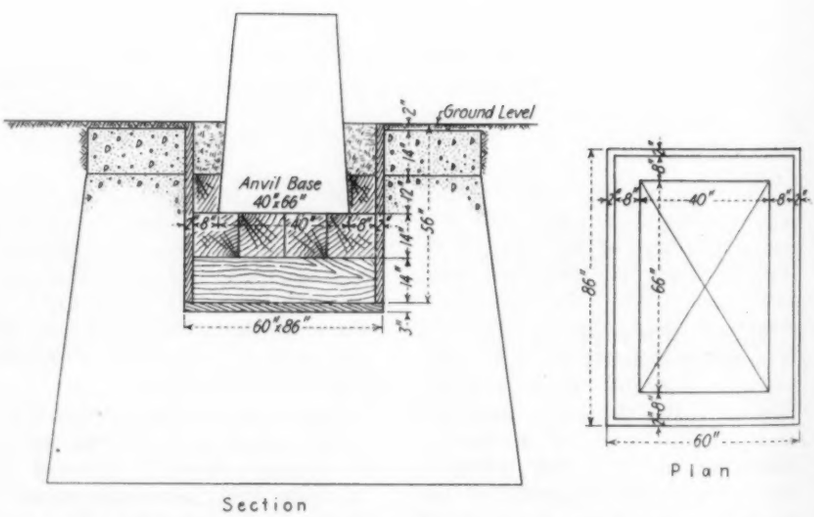


FIG. 3—A layer of natural cork was placed on the bottom and sides of the concrete-lined pit as shown. Use of tar paper prevents forming of fins which help to telephone the vibrations to the surroundings.

set up by Hammers . . . .

to reduce this amplitude. The result of the method employed is shown in Fig. 2. Actually, the same method is equally effective in absorbing high frequency vibrations.

The isolated foundation is shown in Fig. 3. Because of space limitations it was necessary to tear out the old foundation and replace it, which, of course, meant a much more expensive job than if it had been possible to make a new one in another location. From this diagram it will be seen that a concrete lined pit was made. On the bottom of this was placed a layer of 3-in. thick natural cork (Korfund) and on the sides a lining of 2-in. thick cork. The cork was covered with tar paper and concrete was poured over the bottom to a thickness of 14 in. The tar paper is important because it prevents the concrete from entering into the interstices of the cork and forming fins which help to telephone the vibrations to the surroundings. Oak timbers were placed on the concrete block thus formed and the concrete anvil base was set on them. Lateral movement of the anvil is prevented by other oak timbers, as shown, and the space above them was filled with loose earth. The purpose of the timbers is to give an additional resilient element. With this arrangement the vibrations were isolated so that the injunction was removed.

FIG. 2—Record of amplitude after installing vibration-absorbing mats.

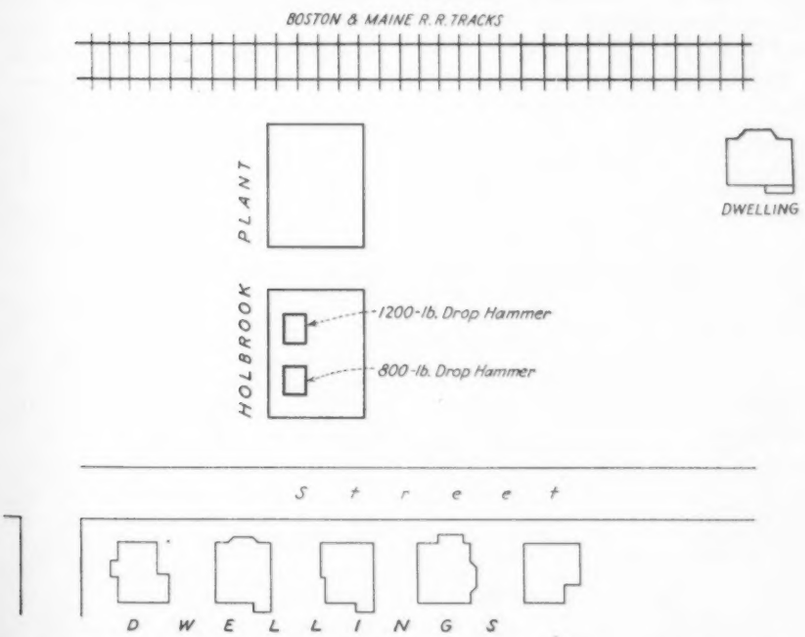


FIG. 4—Until vibration-isolated, these drop hammers were stopped by injunction from operating, although the residents made no complaints about the main line railroad traffic passing their houses.

Another correctional isolation job was done at the plant of the H. E. Holbrook Drop Forge Co., Worcester, Mass. In this case two drop hammers, one 800 lb. and the other 1200 lb., were involved, and, as in the previous instance, the trouble arose from moving to a new location. The situation of the plant with respect to surrounding buildings is shown in Fig. 4. It is an interesting fact that the residents of this section made no complaints about the main line railroad traffic passing their houses, but as soon as the drop hammers started up they got out an injunction. Stoppage of these hammers closed the entire plant down.

The method of isolation was substantially the same in this case as

in that just mentioned. The only difference is that there are no timbers and that the concrete block on which the hammer anvil rests fills the whole pit, except for a piece of iron felt. Tar paper was used between the cork isolating material and the freshly poured concrete block as previously explained.

As there was plenty of room in the building entirely new foundations were built in order to save the expense of ripping out the old ones. The measures taken were effective and the injunction was removed.

When the Crompton & Knowles Loom Works, also of Worcester, later installed a 1200-lb. drop hammer, they put it in exactly the same way as the corrected ones at Holbrook's in order to avoid having any trouble. The cost of the live sheet cork was slightly over $400 and this was all the extra cost that was involved. In this case there was no expense for a new foundation.

Another job in which the isolating material was installed when the machine was put in is that of the United Electric Railways Co., Providence, R. I. The shop was moved to a new location and the vibration absorbing material was installed with the machine in order to avoid having any difficulty. In this case the machine was a 350-lb. Beaudry power hammer striking 2100-lb. blows at the rate of 240 a minute. This would cause a high frequency disturbance, if not corrected.

Expense was saved by using an old foundation, lining the bottom and sides of it as far as there is any contact with sheet cork, and then setting the anvil on sheet cork on top of the isolated concrete block. As the pit was larger than necessary the extra space was floored over with boards. The cost of the cork was less than $200. It is altogether probable that this precautionary measure saved a great deal of trouble and expense. The method of installation is shown in Fig. 5.

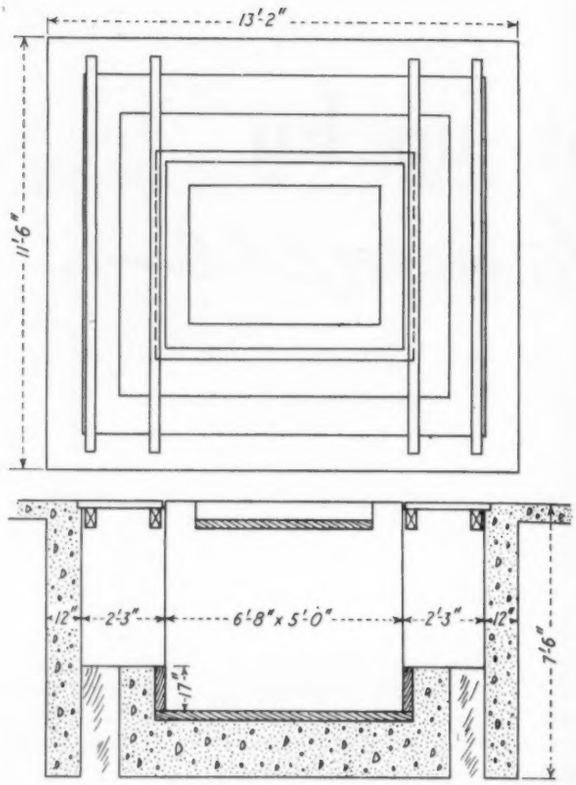


FIG. 5 — Vibration-absorbing material installed in connection with the foundation for a power hammer that strikes 2100-lb. blows at the rate of 240 per min.

Sheet cork used in this way in its live, or natural, state keeps its resiliency indefinitely. The important detail is to distribute the load over a sufficient area, and to have it of sufficient thickness, so that the natural structure of the cork will not be broken down. If this is done there seems to be a complete absence of breakdown from fatigue or age, and it is not affected by moisture. So far as is known this kind of installation, when properly made in the first place will last indefinitely, or at least as long as the life of the machine it isolates.

Machinery Exports 1936-1937

o o o

W. H. RASTALL

Formerly Chief, Industrial Machinery Division, Department of Commerce

o o o

THE situation in the machinery export trade has suddenly become unusually interesting, for important changes are taking place and suggest developments of great importance. The story is a little complicated because of its relation to the situation in the world capital market, and the telling necessarily involves certain features of the domestic situation, but, if followed, ends in a tale of real significance. It also suggests a standard by which to measure the degree of recovery from the world wide depression in the various areas.

In the 1923-1929 period, exports of strictly *industrial* machinery grew from $123 million annually to $265 million. and in the peak month, March, 1929, approximated a million dollars per working day. We are apt to think of that as an enormous volume and a peculiarly attractive trade, which it was, but strangely, both in boom and depression, the ratio of export to domestic sales, is remarkably constant at approximately 8 to 10 per cent. Any market that accounts for 8 per cent of volume in bad times is both valuable and important, but obviously is cultivated more actively when it accounts for the same percentage when the business is booming.

Late in 1929, suddenly, something went wrong with the monetary-credit mechanism abroad, as well as at home, and, from boom to depression, this trade shrank 86.7 per cent.

March, 1929 ..... $25,645,339
May, 1933 3,400,060

What conspiracy was it that caused machinery buyers in all countries to stop placing orders in practically the same ratio and at just the same time as the decline in domestic business? Note the experience in the following branches of the machinery trade which are indicative of what occurred throughout the whole of that trade.

With machinery exports in these lines depressed 93 to 98 per cent and 86 per cent for the total, manufacturers, operating in the red, became relatively inactive abroad. But since 1933, and entirely apart from the situation in the United States, the world has made important progress toward recovery in the demand for industrial machinery. Data recently

	Domestic	Export
Machine Tools		
High	February, 1929	June, 1931
Low	March, 1933	April, 1933
Decline	95.7%	93%
Woodworking Machinery		
High	January, 1929	December, 1929
Low	March, 1933	May, 1933
Decline	97.4%	95.4%
Industrial Pumps		
High	April, 1929	February, 1929
Low	January, 1933	March, 1933
Decline	87.2%	93.7%
Foundry Equipment		
High	May, 1928	June, 1931
Low	March, 1933	July, 1933
Decline	97%	98.2%
Air Conditioning Equipment		
High	July, 1931	May, 1929
Low	February, 1933	December, 1932
Decline	80%	97.2%

Machinery Exports by Classes

		1929 (HIGH)		1932 (LOW)		1935 (RECENT)	
		QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE
Locomotives	Number	207	$4,767,201	9	$114,827	32	$813,895
Fire Tube Boilers	Square feet	296,849	683,859	23,984	39,561	25,897	73,839
Water Tube Boilers	Square feet	573,403	1,406,783	47,864	76,558	72,481	195,303
Diesel and Semi-Diesel Engines	Number	904	1,261,307	51	220,884	331	978,474
Other Internal Combustion Engines not over 10 H.P.	Number	35,651	3,066,797	3,821	245,787	10,197	570,187
Excavators including Power Shovels	Number	648	7,295,736	72	865,678	87	1,117,475
Concrete Mixers	Number	2,172	1,402,420	82	73,277	247	131,983
Road Rollers	Number	109	308,835	11	16,756	54	153,031
Cranes with Swinging Booms	Number	129	850,088	7	21,758	18	95,364
Other Cranes	Number	332	1,908,784	22	72,606	44	229,718
Rock Drills	Number	13,644	2,254,249	3,301	506,185	6,714	1,422,798
Centrifugal Pumps	Number	6,114	2,144,982	1,527	441,298	3,577	1,093,068
Reciprocating Steam Pumps	Number	6,688	2,062,144	857	226,283	1,598	377,323
Engine Lathes	Number	879	1,928,345	187	651,325	993	1,369,005
Vertical Boring Mills and Chucking Machines	Number	208	452,368	66	403,618	215	1,060,727
Knee and Column Type Milling Machines	Number	537	1,289,560	125	325,428	297	962,447
Other Milling Machines	Number	681	1,588,937	172	664,471	698	2,004,924
Gear Cutting Machines	Number	434	1,330,860	149	678,576	402	1,440,635
Surface Grinding Machines	Number	288	326,709	63	130,710	455	933,724
External Cylindrical Grinding Machines	Number	824	1,866,046	132	348,589	283	899,409
Foundry and Molding Equipment	....	....	2,034,596	....	342,924	....	983,807
Pneumatic Portable Tools	Number	24,736	2,033,876	4,762	350,043	11,289	703,063
Circular Hosiery Knitting Machines	Number	5,785	2,601,603	1,196	475,936	913	532,095
Cotton Looms	Number	2,489	632,887	580	194,398	604	224,144
Shoe Machinery	....	....	1,988,384	....	603,088	....	653,075
Bakery Machinery	....	....	1,002,368	....	183,039	....	402,899
Flour and Grist Mill Machinery	....	....	686,095	....	122,785	....	452,751
Sugar Cane Mills	Number	3,166	720,564	431	104,185	1,232	90,481
Saw Mill Machinery	....	....	940,906	....	176,368	....	289,580
Blowers and Ventilating Machinery	....	....	2,162,559	....	426,992	....	467,848
Brewer's Machinery	....	....	1,025,609	....	60,926	....	147,592
Cotton Gins, Cotton Presses and Parts	....	....	477,954	....	47,437	....	1,559,809
Air Compressors—over 25 cu. ft.	Number	14,018	1,272,311	2,465	192,486	3,788	301,484
Air Compressors—over 25 cu. ft.	Number	5,413	6,317,115	681	1,077,611	1,227	1,589,925
Power Driven Machines for Commercial Laundries	Number	3,822	2,033,590	198	146,969	220	91,018
Typesetting Machines	Number	1,727	5,769,732	298	1,010,889	642	2,221,426
Printing Presses	Number	3,005	6,472,435	480	1,635,297	1,765	3,246,396
Total Agricultural Implements	....	....	140,800,629	....	10,548,296	....	32,039,873
Cream Separators	Number	12,420	700,453	6,992	360,926	1,350	79,909

made available by the Industrial Machinery Division, Department of Commerce, reveal:

Industrial Machinery Exports

1929 (Peak)	$265,209,000
1933 (Low)	55,284,000
Decline (annual basis)	79.2 per cent
1935	$121,784,000
Increase from 1933	120 per cent
Ratio to Peak—1929	46 per cent

This increase brings the volume of exports to about the 1923 level which was the beginning of a period of active and important expansion. Has the time now come to again cultivate this market that proved so valuable from 1923 to 1929?

Financial considerations are involved. Industrial machinery is purchased with funds made available from either "new capital issues" (exclusive of refundings) or "profits plowed back." Unfortunately, only limited data regarding new capital issues abroad are available, and practically no information can be developed regarding profits plowed back, but, because of the relationship shown above, and at the risk of employing a very poor statistical method, it is entertaining to compare the fluctuations of "New Capital—Corporate" as reported for the United States in the *Financial Chronicle* with the variations in exports of industrial machinery.

	New Capital Corporate Monthly Average (In thousands)	Industrial Machinery Exports (In thousands)
1923	$219,615	$123,598
1924	252,420	130,836
1925	300,375	149,379
1926	312,829	156,605
1927	388,113	183,169
1928	445,506	206,212
1929	666,839 (Peak)	*265,209 (Peak)
1930	373,590	225,637
1931	129,264	141,835
1932	27,114	58,491
1933	13,382 (Low)	55,284 (Low)
1934	14,855	98,354
1935	33,631	121,784
1936 (1st half)	76,264	.....

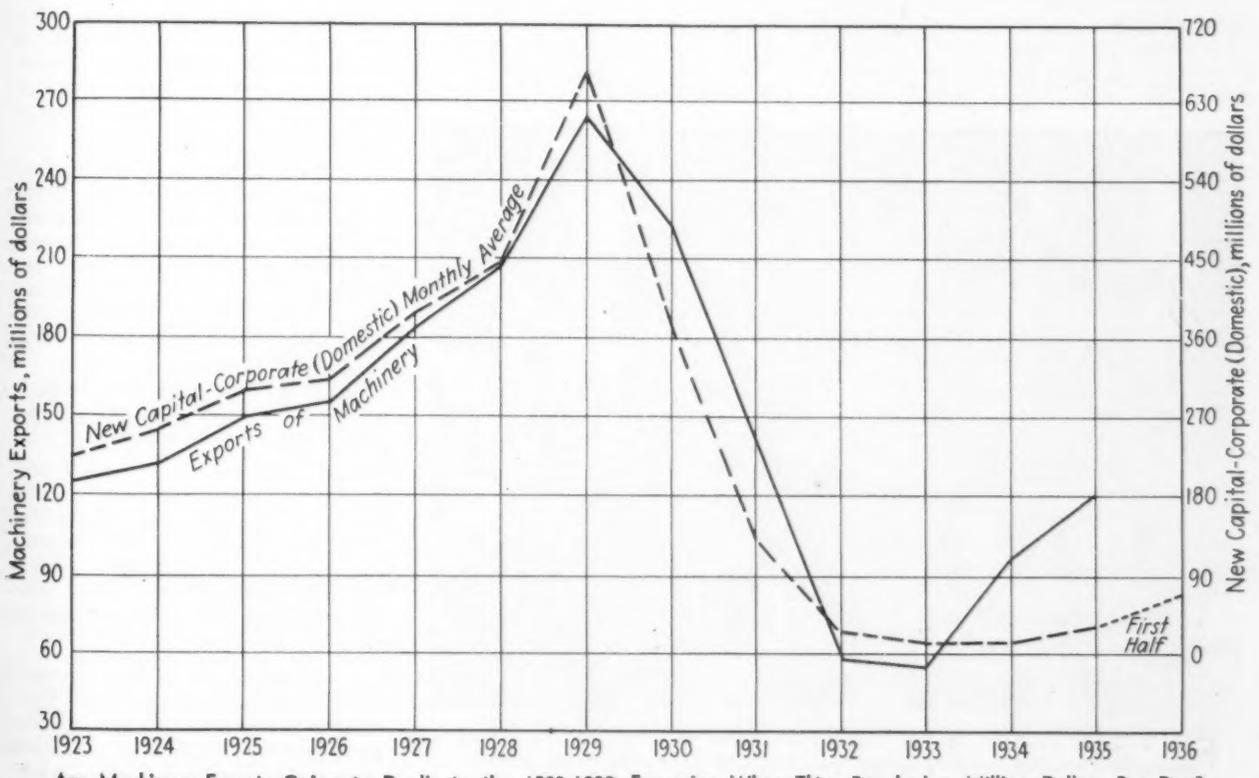
(* In this series, figures for years prior to 1929 are not strictly comparable with those for later years.)

Of course the relationship shown here and in the chart should not be treated as anything more than an interesting suggestion. No demonstrable economic law is involved. While, obviously, equipment like steam turbines, their boilers, etc., are commonly purchased with the returns from these new capital issues, other types of equipment, such as woodworking machinery, are purchased from "profits plowed back." But the financial situation that releases new capital is the same that will enable management to plow in profits—the considerations that frighten capital and prevent new issues are the same that force management to husband reserves to meet a possible emergency. But, obviously, the unemployment in the machinery industry and the low volume of business in that area reflect a monetary-credit situation. We will leave it to the sapient to explain the details of the how, the why and the cure, but it is just the point which is the source of the distress suffered since July, 1928, when the trouble started in Australia.

The Royal Bank of Canada in its letter for July, 1936, states:

"The long-awaited transition from a recovery based upon the artificial stimulation of demand for consumers' goods by government spending to a broad improvement in the production of producers' goods is now under way in the United States of America. The change is taking place quietly. By compiling the statistics showing the expansion in private building, the continued growth in the production of steel, lumber, machine tools and various types of industrial machinery, one can clearly differentiate the recovery taking place in 1936 from that which occurred in the two preceding years. The concl-

(CONTINUED ON PAGE 119)



Are Machinery Exports Going to Duplicate the 1923-1929 Expansion When They Reached a Million Dollars Per Day?

"Crobalt" Enters National Cutting Field

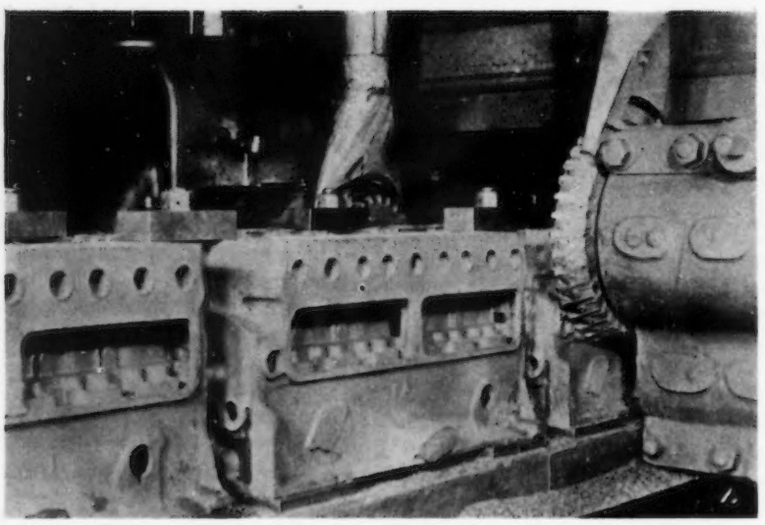


FIG. 1—Rough and finish milling of cover side of cylinder block on a line type Ingersoll. Length of cut 23/8 in., depth 1/16 to 1/8 in. Actual cutting time 2 blocks 1 min. 4 sec. Overall time 2 blocks 1 min. 15 sec.

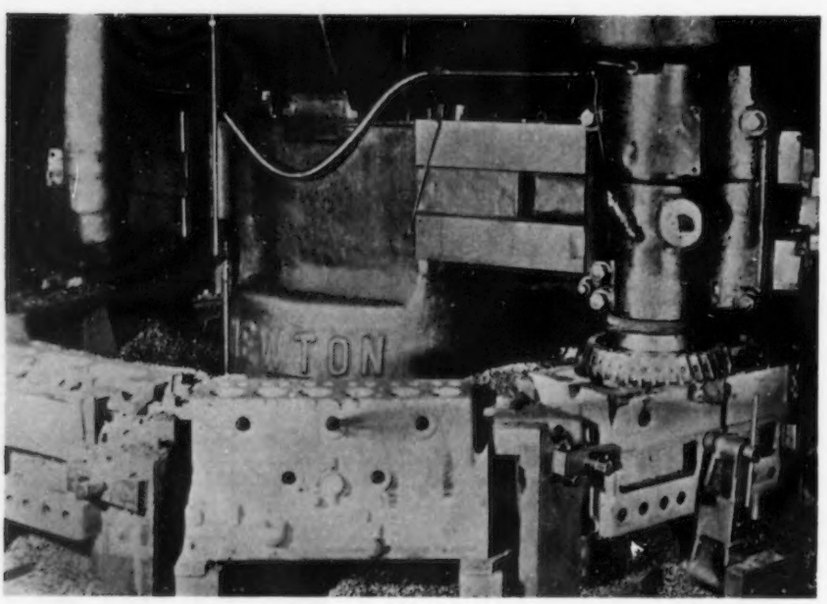


FIG. 2—Same block having top and bottom milled on a two-loading station rotary Newton. The roughing cutter operates at 31 r.p.m., the finishing cutter at 35 r.p.m. with cutting speeds of 114 and 128 linear ft. per min. Production is 40 blocks per hr.

DEVELOPED originally around 1924, "Crobalt," the cutting alloy which has just been placed on the market nationally both in bulk and in the form of cutting tools by Michigan Tool Co., Detroit, has been in limited production in the Detroit area during the past two years and has found rapidly increasing application in two or three large plants, particularly in the automotive industry, for lower cost, higher speed, cutting of cast irons. Crobalt's relatively low cost makes possible manufacture of the entire cutting tool from the metal, avoiding tedious and costly brazing or welding of tips to steel shanks. This applies particularly to smaller or medium sized tools. Where necessary, however, Crobalt has the definite advantage over competitive cutting metals, it is claimed, of being easier to braze—an important consideration, for instance, in the manufacture of some types of milling cutters.

Crobalt is a non-ferrous, high speed cutting alloy whose major ingredients, tungsten, cobalt and chromium, are combined with certain other constituents that are said to be responsible for the alloy's high cutting efficiency and long life. Moreover, these latter ingredients are said to possess the faculty of making possible remarkably high standards of uniformity and purity in its manufacture.

The alloy itself is melted in electric furnaces and cast in permanent molds at temperatures of around 3000 deg. F. and it is said that its qualities are not affected by cooling after preheating to any temperature below that of its melting point (2800 deg. F.).

Tools made of Crobalt apparently have unusually good free-cutting properties. In this respect an important development in one large plant has been Crobalt's successful application to the cutting

of steels—though, as has been noted, it was originally developed primarily for more efficient, lower cost cutting of cast irons, etc.

Another feature of the metal is that productivity per grind is apparently not affected within a wide range by cutting speed or tool temperature. This makes possible a marked stepping up of production per hour without sacrificing tool life. Frequently it is also possible to cut cast iron, etc., without lubrication or artificial cooling even at speeds producing red heat in the tool.

In taking over sponsorship for Crobalt, Michigan Tool Co. has announced that the metal will be available in the form of both standard and special cutting tools, and also in bulk to other manufacturers. In addition to turning, forming, facing tools, etc., a complete line of straddle and face-milling cutter blades and assemblies is offered. The manufacturer states that tests have indicated an average increase in productivity per grind of 20 per cent as compared with competitive cutting metals. The percentages are said not to take into account the fact that on an average considerably less grinding was found necessary with Crobalt.

Cutting speeds up to three times those conventionally used with high speed steels have been found to represent a good average in the cutting of cast irons, the best operating speed depending, of course, upon the character of the material being cut, the type and age of machines, etc.

Grinding of Crobalt tools involves no special problems, it is said. Along this line the only major recommendations made are that in grinding the tool, the wheel should not be allowed to ride on the work and that in dressing wheels the latter should not be trued too smooth with diamonds. A slightly coarser or possibly softer wheel has sometimes been found to provide even easier grinding.

In accordance with its standard policy Michigan Tool Co. will design special tooling involving the use of Crobalt where required. In general, the field the new material is designed to cover comprises that wide range between relatively short-lived high speed steels and high cost cemented tungsten carbides—although, of course, not offered as a substitute for the latter. For turning and boring operations, for instance, Crobalt is said to be ideally adapted to roughing and semi-finishing, but is not recommended where it is desired to obtain the extremely highly polished surfaces commonly produced with tungsten carbides.

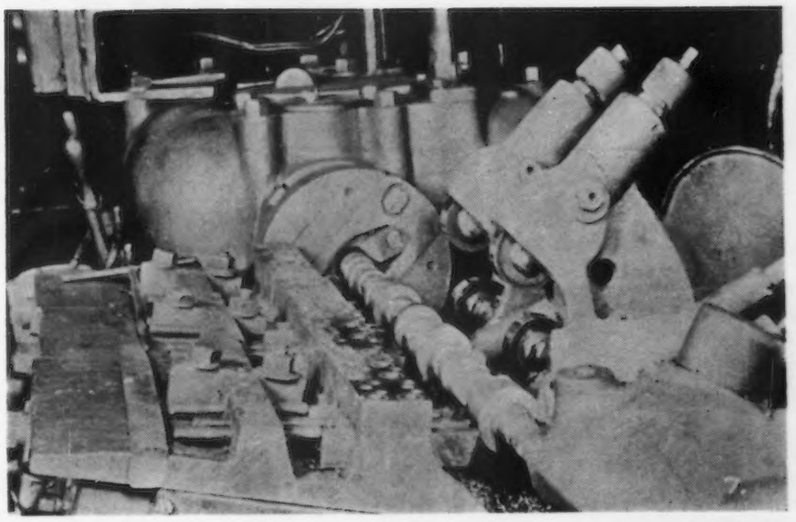


FIG. 4—Crobalt tooling on a Lo-Swing lathe, used to face bearings. Cutting time 28.8 sec. with 1/16-in. depth of cut and cutting speed of 71.4 ft. per min.

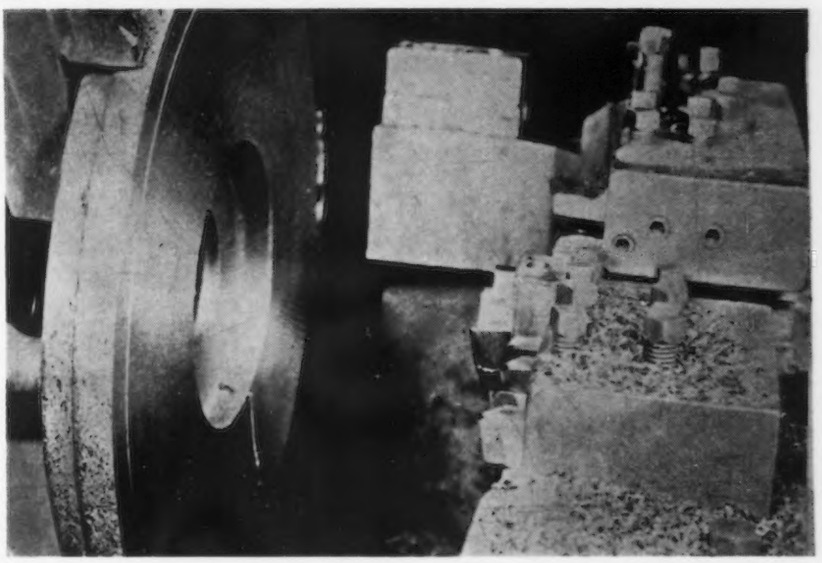


FIG. 3—A flywheel is being rough and finish faced and bored on the clutch side on a Gisholt Simplimatic. Depth of cut about 1/8 in. Cutting speed 125 ft. per min. Overall time roughing and finishing 2 min. 40 sec., with three machines per operator.

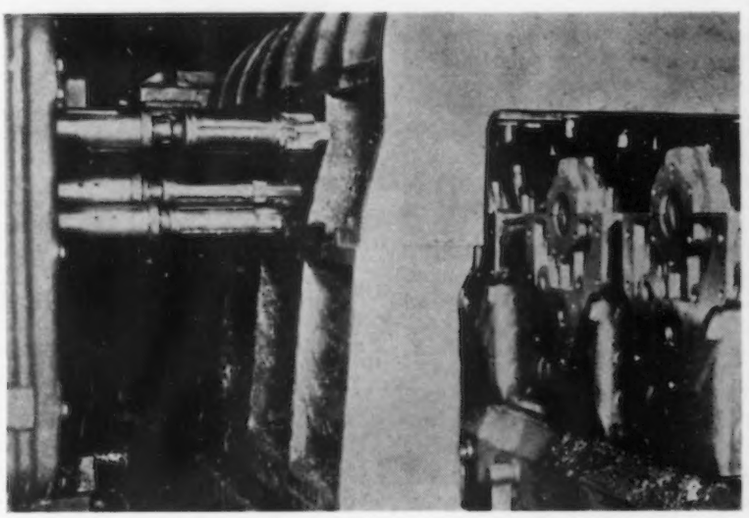


FIG. 5—Cam and crank bearings are being rough bored with Crobalt tools on a Natco, at 100 r.p.m. Depth of cut runs from 1/16 to 1/8 in. and cutting time is 1 min. (1 min. 25 sec. overall) for two blocks.

THIS WEEK ON THE ASSEMBLY LINE

. . . Ford only company still producing 1936 model cars as Chevrolet shuts down for changeover.

o o o

. . . Detroit is given preview of long awaited Packard Six and other improved lines.

o o o

. . . Studebaker adopts over-drive in 1937 President and hypoid rear axle drive in both Dictator and President.

o o o

. . . Reo drops out of passenger car field; to concentrate on trucks and buses.

DETROIT, Sept. 8.—Predictions that model announcements would take place in early September are beginning to be verified a week or so ahead of time. The advancing of the announcement date from January to November, 1935, proved so popular that this year several important manufacturers have advanced the date of announcement even further. Both Packard and Studebaker have already disclosed what they have to offer in 1937, although the cars will not be officially on display until Sept. 12. As has been anticipated in this column, Packard has announced a six in connection with its improved "120" and the Packard super-eight and twelve.

With both Packard and Studebaker in 1937 production, there remained in the field only one company making 1936 assemblies up until the end of last week. This was the Ford Motor Co., which practically accounted for all of the 31,601 passenger cars and trucks assembled in the United States and Canada for the week ended Sept. 5, according to Ward's Automotive Reports. The drop from 59,237 units the previous week is largely accounted for by Chevrolet's shutdown for changeover to new models. All of General Motors' assembly lines were down and the only activity on the part of Chrysler was the Dodge truck division. Trucks will not be announced until Jan. 1, as in previous years. It will not be long, however, before other companies will get into production, although announcements are not expected immediately. Chevrolet's gear and axle and forge plant in Detroit is already in production on 1937 parts. Plymouth is expected to resume operations on Sept. 10 and Dodge should follow shortly thereafter. Although the East Jefferson plant of Chrysler was the first to shut down, it will probably be the last to get into production because of major changes in the six-cylinder motor line.

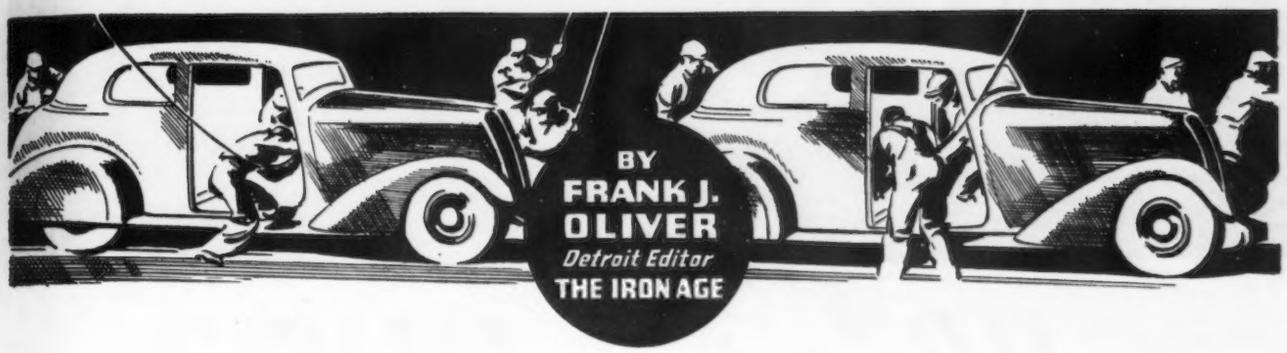
How long Ford will continue to assemble 1936 cars is anybody's guess. Schedules have been revised up and down drastically in the last week, indicating that the company is desirous of making the best of present high level sales before changing over to the 1937 model. From all reports, it would appear that Ford will make its change in an extremely short time, largely by changing the ratio of 1936 and 1937 parts coming in from outside suppliers.

August Output 275,000 Units

Estimates for August production amounted to approximately 275,000 passenger cars and trucks, a substantial increase over the figure of 245,075 units produced in August, 1935. The gain is even more significant when it is considered that this year assembly lines have been shut down earlier than ever before. September obviously will be the low month of the year, just as it was last year. Output should range around 100,000 cars. Output for the third quarter should come up to over 800,000 units, which would make this the best third quarter since 1929.

Packard Host To 4000 Dealers

Packard stole the show in Detroit last week when it brought 4000 dealers into town to witness the unveiling of the new cars. They started back to their homes driving more than $3,000,000 worth of Packard demonstrators. All De-



troit was invited to a special Labor Day week-end preview of the new cars. As the illustration shows, the new Packard six closely resembles the 1936 "120" and obviously even more closely resembles the 1937 eight-cylinder job. As was anticipated, the characteristic Packard lines, particularly of the radiator shell and hood, have been retained. In fact, it is almost necessary to use a tape measure to distinguish the two cars, the smaller of which has a wheelbase of 115 in. in place of 120 in. for its bigger brother.

The new Packard six has many parts identical with the ones used in the "120." This is true of the semi-centrifugal clutch, the transmission, steering gear, "Safety-T-fleX," front wheel suspension, springs, rear axle and many other component parts. The six-cylinder engine is an L-head type developing 100 hp. as compared with 120 hp. for the eight-cylinder engine. Strokes are the same for each engine, but the six-cylinder block has a bore of 3 7/16 in., as compared with 3¼ in. for the "120." Whereas the eight uses an aluminum head, the six-cylinder employs a cast iron head. Both employ a new cylinder block alloy which is said to greatly retard cylinder wear. Improvements have been made in the engine to increase both gasoline and oil economy.

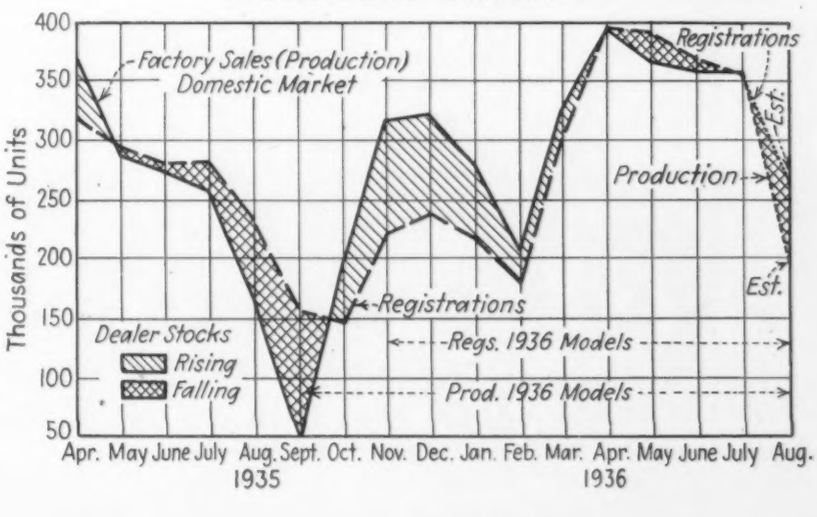
Bodies for the Packard six, as well as all the other Packards, are made in the company's own body shops. Interior dimensions of the six and the eight are said to be the same. This new six will range in price from $795 to $910 f.o.b. Detroit, which will place it in direct competition with the Oldsmobile six and the Buick "40." Tentative schedules for 1937 indicate that the company will manufacture 50,000 sixes, 75,000 "120's" and 8000 of the Packard super-eight and the twelve.

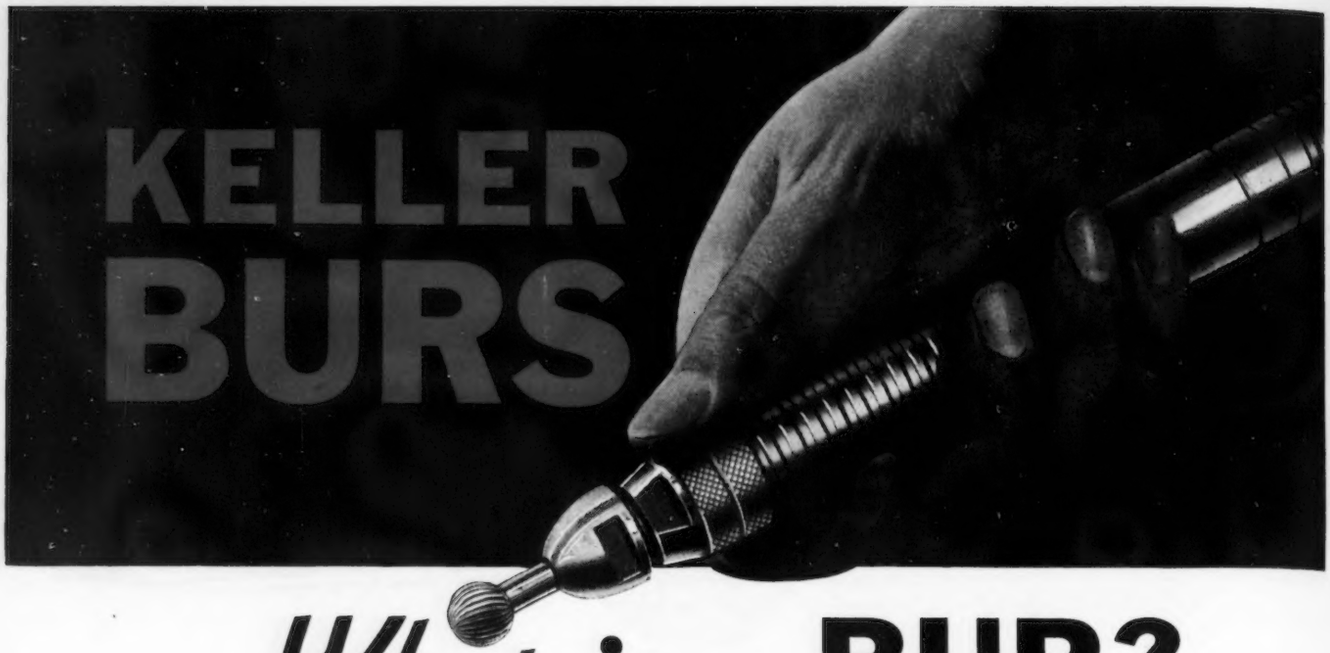
If one were to judge by the appearance of the new Packards, it would seem that body changes for 1937 will be minor and the cars will be quite conventional in appearance. Fender lines on the Packard have not changed. One can find the same curves both front and rear on many of the 1936 Chrysler or General Motors lines or the Hudson bodies. The Packard rear end has a very conservative tilt, as has the windshield. Studebaker, in its announcement, shows more advanced lines. The radiator has new horizontal grids, which remind one of the Lincoln Zephyr front end, and these grids swing back to become horizontal louver lines on the one-piece hood, which is hinged at the rear. As is conventional practice today, the one-piece fenders blend into the radiator contour and the fenders are "faired" to reduce wind resistance. An innovation is the use of colored rubber running boards to match the bodies.

Studebaker Makes Mechanical Changes

Studebaker's new lines incorporate a number of important mechanical changes. First among them is a new over-drive transmission that is automatically selective above 35 m.p.h. It is available only on the President series. This overdrive is attained through sun and

RELATION OF FACTORY SALES TO DEALERS AND REGISTRATIONS
PASSENGER CARS – U.S. ONLY





What is a BUR?

Many executives do not realize the many jobs this small inexpensive handy tool will do. A bur is a rotary file or mill cut tool, shaped to do a particular job or to reach a difficult place. Often a bur driven by a flexible shaft will do work that otherwise would be impossible or highly expensive.

Here are a few places where Keller Burs are used:

Aluminum Foundries and Aircraft Manufacturers
To remove excess metal and parting line from the fins of cylinder heads.

Brass Foundries
For cleaning castings.

Welding shops
To remove high spots left by welding process.

Glass and Bakelite Manufacturers
For finishing moulds.

Die Shops
For finishing all kinds of dies from the smallest jewelry dies to those used in forming automobile bodies.

Machine Shops — Large and Small
For bench work such as countersinking holes impossible to get at in the usual manner; removing burrs left after machining surfaces—such as worms, chucks, worm gears, etc.

Our catalog S-451 illustrates over 300 various shapes, types and cuts. We shall be glad to send it upon receipt of your request.

PRATT & WHITNEY DIVISION
NILES-BEMENT-POND COMPANY
KELLERFLEX SALES DEPT., HARTFORD, CONNECTICUT

planet gears in conjunction with an over-running roller clutch. The car coasts against the engine compression in all speeds, however, just as with the conventional transmission. The transmission itself has been improved through the use of a new synchronizing unit employing a fool-proof floating ring having a blocking action and carrying the synchronizing cone. Studebaker also joins with Packard in using a hypoid rear axle, a name with which most readers had better become familiar, since both Chrysler and General Motors cars will incorporate them this coming season. The hypoid gear, a development of the Gleason Works, employs a spiral bevel pinion, the driving axis of which is offset from the center line of the ring gear. In application to an automotive drive, this permits lowering the propeller shaft and the use of a lower body floor without the necessity of a tunnel or sacrificing road clearance. On the new Studebaker, the floor is 3 1/16 in. lower at the door openings, giving an increase in door height without raising the height of the car.

Independent wheel suspension of the "Planar" type is used at the front as before, but a new type of airplane landing gear direct-acting shock absorber is used at both front and rear. These "shocks" are compact and embody ride control, impact recoil and temperature control.

Easier steering is assured through the use of a steering cam or worm having two studs in engagement with it, as compared with the single follower stud normally employed. The action of this dual stud arrangement is such that the leverage ratio is increased as the angle of turning is increased, thus facilitating parking and increasing road stability.

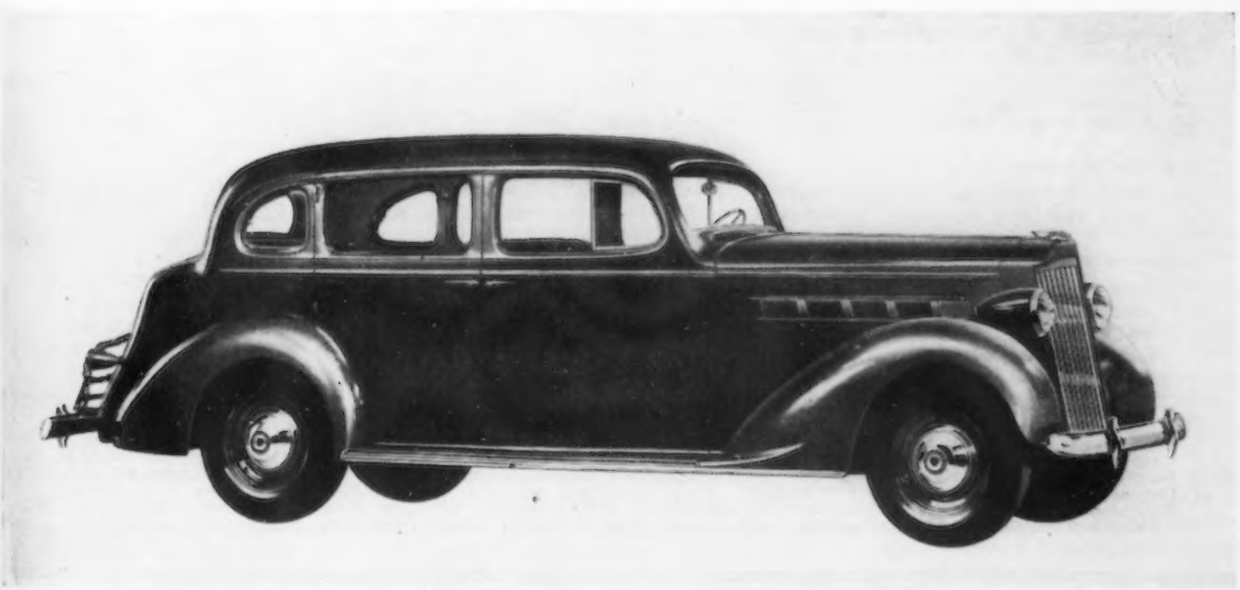
Several minor motor changes have been made, including the use of Fram oil and motor cleaners that practically eliminate oil changing. The automatic choke has also been improved and simplified. In the Dictator, manganese steel connecting rods are employed in the motor for the first time. The 1937 Dictators are also equipped with a rubber insulated universal joint which automatically eliminates lubrication requirements.

Reo to Make Trucks Only

Reo also made an important announcement about its 1937 passenger cars. There aren't going to be any. Reo has decided to concentrate on its truck and bus business instead of making it a sideline. As a matter of fact, sales of passenger cars and trucks for the first seven months of this year were about equal, according to registration figures, the former being 2280 as against 2305 trucks and buses. Total output for Reo for the first seven months of 4585 units just about equals Ford's daily run during the same period. The move seems to be a sensible one, since the only independents that have made any progress against the Big Three have been Packard and Nash. In the meantime Toledo fetes Willys-Overland Motors, Inc., and cheers David R. Wilson and his cohorts on to bigger and better activity in 1937. Mr. Wilson announced that the company already had commitments for nearly 50,000 cars of the 70,000 units planned.

It is surprising that few companies other than Studebaker are adopting an over-drive for 1937. Although the over-drive shows marked economy in gasoline consumption, particularly on cross-country driving, there is no evidence that Chrysler will extend this feature down into the Dodge or Plymouth class as standard equipment. Earlier in the year it was anticipated that the over-drive offered as optional equipment on Dodge would be made standard for next year. From last reports, however, it will remain a premium item. General Motors will offer an over-drive by the roundabout way of offering an automatic transmission on Buick and Oldsmobile. It seems almost certain that this fully automatic transmission will be offered only as optional equipment since Buick has not yet made up its mechanical mind as to what final items of equipment it will purchase to complete the line for this job. About two months ago, every machinery man in the country was camping on Buick's doorstep at Flint when this transmission was up for tooling. The hubbub subsided for a while, then began again when it was understood that there were still a few odds and ends of machinery to be decided upon. With Buick already getting into experimental production on 1937 cars, it is simply not possible for the new transmision to be offered as standard equipment.

THE LONG-AWAITED PACKARD SIX. You would have to use a tape measure to distinguish it from the new "120", which has a 5-in. longer wheelbase, and which incorporates many identical components.



Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	July, 1936	June, 1936	July, 1935	Seven Months, 1935	Seven Months, 1936
Raw Materials:					
Lake ore consumption (gross tons)[a]	3,826,050	*3,763,289	2,198,189	16,554,181	23,438,546
Coke production (net tons)[b]	3,828,548	3,787,711	2,612,411	19,635,159	25,123,848
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,594,268	2,586,240	1,520,263	11,319,263	16,122,494
Pig iron output—daily (gross tons)[c]	83,686	86,208	49,041	53,393	75,690
Castings:					
Malleable castings—production (net tons)[d]	44,413	43,766	28,915	260,812	318,505
Malleable castings—orders (net tons)[d]	41,031	42,848	25,526	245,754	306,086
Steel castings—production (net tons)[d]	78,654	70,323	31,125	212,050	420,236
Steel castings—orders (net tons)[d]	74,001	94,345	34,570	216,940	497,555
Steel Ingots:					
Steel ingot production—monthly (gross tons)[c]	3,922,731	3,984,845	2,267,827	18,310,478	25,249,066
Steel ingot production—daily (gross tons)[c]	150,874	153,263	87,224	101,163	138,731
Steel ingot production—per cent of capacity[c]	68.74	69.83	39.40	45.70	63.21
Finished Steel:					
Trackwork shipments (net tons)[c]	5,916	6,507	4,054	25,629	40,508
Steel rail orders (gross tons)[c]	56,880	13,200	32,700	307,757	653,228
Sheet steel sales (net tons)[f]	192,873	261,439	206,313	1,351,298	1,400,959
Sheet steel production (net tons)[f]	217,651	210,448	145,505	1,371,398	1,492,309
Fabricated shape orders (net tons)[g]	188,053	128,520	65,957	584,947	938,724
Fabricated shape shipments (net tons)[g]	147,824	150,790	100,758	605,396	825,238
Fabricated plate orders (net tons)[d]	60,324	51,999	18,890	118,352	289,806
Reinforcing bar awards (net tons)[e]	45,245	14,505	12,045	122,550	221,840
U. S. Steel Corpn. shipments (tons)[h]	950,851	886,065	547,794	4,101,793	5,982,201
Ohio River steel shipments (net tons)[i]	110,495	109,455	77,464	486,112	576,116
Fabricated Products:					
Automobile production, U. S. and Canada[k]	451,474	470,887	350,054	2,723,227	3,058,089
Construction contracts, 37 Eastern States[l]	$294,833,800	$233,054,600	$159,257,500	$855,764,300	$1,532,564,500
Steel barrel shipments (number)[d]	752,223	702,132	555,649	3,588,613	4,597,984
Steel furniture shipments (dollars)[d]	$1,510,716	$1,470,195	$1,224,722	$8,123,294	$10,722,134
Steel boiler orders (sq. ft.)[d]	.....	1,130,886	519,012	3,192,645	.....
Locomotive orders (number)[m]	9	24	5	21	131
Freight car orders (number)[m]	4,469	4,320	5,000	7,083	31,023
Machine tool index[n]	150.1	128.8	119.8	‡94.7	‡132.6
Foundry equipment index[o]	159.6	141.4	94.0	‡98.3	155.4
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	47,940	59,910	31,894	214,757	367,085
Imports of pig iron (gross tons)[p]	12,496	16,793	5,519	59,005	110,003
Imports of all rolled steel (gross tons)[p]	19,638	15,715	18,719	111,691	143,406
Total iron and steel exports (gross tons)[p]	296,738	294,951	296,782	1,889,469	1,928,329
Exports of all rolled steel (gross tons)[p]	93,365	100,303	83,171	494,484	626,855
Exports of finished steel (gross tons)[p]	83,599	89,287	68,129	433,234	570,913
Exports of scrap (gross tons)[p]	192,817	186,696	205,779	1,321,721	1,243,090
British Production:					
British pig iron production (gross tons)[r]	661,100	644,100	547,300	3,720,300	4,410,200
British steel ingot production (gross tons)[r]	974,100	965,900	803,300	5,604,500	6,718,300
Non-Ferrous Metals:					
Lead production (net tons)[s]	39,576	38,818	34,424	226,903	*263,591
Lead shipments (net tons)[s]	38,996	37,736	34,575	230,007	*253,473
Zinc production (net tons)[t]	45,553	44,947	35,120	244,996	309,285
Zinc shipments (net tons)[t]	41,891	41,654	32,306	247,278	294,378
Deliveries of tin (gross tons)[v]	7,120	7,795	5,290	33,680	44,140

‡ Three months' average. * Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Weekly Index of Rate Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

The Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	80.1	Same week 1933	53.8
Preceding week	87.2	Same week 1932	31.6
Same week last month	86.6	Same week 1931	55.3
Same week 1935	66.5	Same week 1930	81.2
Same week 1934	43.5	Same week 1929	114.1

A SHARP drop in the automobile series was mainly responsible for lowering the capital goods index last week to 80.1 per cent of the 1925-27 average. Its previous level had been 87.2, or 7.1 points above the new showing. At the same time, there were some other instances of loss, the index of steel ingot production and the lumber shipments series each declining by about 1.5 points. Another component, the heavy engineering construction index, receded slightly. Industrial operations at Pittsburgh, however, rose over the previous showing. All of the above mentioned indices, which are components of THE IRON AGE's capital goods activity index, were adjusted for the usual seasonal change.

At least a temporary tapering off of general industrial operations was indicated by these factors last week. While the combined index responded most noticeably to the decline in automotive output, it likewise gave indication of lessening activity in other directions. The Labor Day week-end may have influenced the situation to some extent. Compared with conditions at this time a year ago, the present level of the index reveals that 1936 is still out in front, having last week exceeded the activity of the same 1935 period by over 20 per cent.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Book Lists Names and Properties of Alloys

A RECENTLY published 600-page book, "Engineering Alloys," alphabetically lists 8200 different proprietary alloys made in the United States and various foreign countries. Suitable cross-indexing is supplied so that the trade-name, composition, properties and manufacturer of any one alloy are easily and quickly found. This encyclopedia is particularly timely for the trade has long demanded correlated data for the thousands of new alloys which have been placed on the market within recent years. Also included in the book are a list of unclassified alloys, a bibliography, important conversion tables, and definitions and miscellaneous information about metals and alloys. This book is the result of five years of painstaking effort on the part of the authors, N. E. Woldman and A. J. Dornblatt. It is being sold for $10 by the American Society of Metals, 7016 Euclid Avenue, Cleveland.

WASHINGTON. . . . . .

. . . John L. Lewis marches down gangplank into Senator Guffey's arms and promises to deliver Pennsylvania's labor vote as per schedule.

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. . . Major Berry goes haywire on steel wage statistics — Chamber of Commerce intimates that knowledge of elementary arithmetic would have forestalled release of misinformation.

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. . . New Deal takes care of its own—August employment figure advanced to 824,000.

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By L. W. MOFFETT
Resident Washington Editor, The Iron Age

° ° °

WASHINGTON, D. C., Sept. 8.—A large part of the steel industry is situated in Pennsylvania. The 36 electoral votes of this traditionally Republican state are frantically desired by the New Deal, and the turning of these votes to its Presidential candidate would mark the first time since the election of its own Buchanan that Pennsylvania has gone Democratic nationally, if license may be granted to call the New Deal Democratic. The attempt now being made is to keep another native of Pennsylvania, this time a Republican, from going to the White House.

So in order to do the trick—or to attempt it—strategy seems to call for stirring up class strife, smearing steel in particular and industrialists in general and labeling them with such banal terms as "economic Royalists" and "Princes of privilege" in an effort to scoop up the votes of their employees. A feint at unionizing steel, making charges of "coercion and intimidation" of employees against two Pittsburgh district steel companies by a New Deal Senate committee, which puts "detectives" on the trail preliminary to its inquisition, play a part in the dance of political frenzy. John L. Lewis is apparently so satisfied with his tactics that when he is greeted by Senator Guffey, chairman of the Pennsylvania Democratic Committee, on his return from Europe that he boasts that Pennsylvania will go New Deal. Thus he unmasks, as if that were necessary, the transparent fact that his CIO campaign is primarily a move to deliver Pennsylvania to the New Deal and that, as an immediate objective, organization of the steel industry is only an incident. Probably neither his long-range view looking to a national Labor party under his own leadership nor the Presidential bee buzzing, quite delusively, in his bonnet—as much so as the will-o'-the-wisp vision of solidly organized or solidly unorganized labor vote or of bringing steel workers under the banner of the CIO—were ever in prospect.

As for steel workers, they have shown clearly they do not want a strange assortment of outsiders to bargain collectively or otherwise for them, seeing that they are dealing with the technique of steel and not the technique of ladies' garments. This recalls the waggish suggestion that the real reason the veteran Mike F. Tighe resigned as head of the Amalgamated Association of Iron, Steel and Tin Workers, which reluctantly affiliated with the rebellious CIO, was that he knew too much about the technique of steel and nothing about the technique of women's gowns. Under the strange conception of the CIO, knowledge of the latter is apparently necessary for successfully bargaining over tonnage rates of steel. Mike Tighe's knowledge of manipulating a rabble in a puddling furnace or turning thin gage sheets in a rolling mill, of mixtures, heats, etc. has become outmoded; it has given way to profundities on shoes, beeswax, cabbages, kings and ladies' garments.

Coercion of Votes

But getting back to the political situation of which the steel industry has been made a football, the New Dealers have been told by the Republication National Committee that if they propose to pluck fanciful beams from others' eyes, New Dealers will have motes taken from their eyes. The Republican committee has announced that "While the New Deal Campaign Investigating Committee rushes detectives to Pittsburgh to sift allegations that two steel companies are forcing workers to support the Republican ticket, the Republican National Committee will continue to expose the activities of the New Deal horde of bureaucrats who are ruth-

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ALLEGHENY STEEL COMPANY

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To the Trade:

The entry of West Leechburg Steel Company into the Allegheny family is a logical move of two adjacent, non-competitive producers, each of whom supplements the other.

Our lack of facilities for the production of hot and cold rolled strip has been accentuated by the rapid development of, and demand for, Allegheny Stainless and Magnetic Steels in strip form. In remedying the need, we have acquired an organization of specialists in the production of quality strip, whose mechanical facilities are second to none, and whose valuable experience is reinforced by long practice in working with all grades of Allegheny Stainless. We, in turn, will supply West Leechburg's lack of facilities for the production of raw steel.

Thus, with benefit to all concerned, we materially increase the scope of our service to users of Allegheny Products. Our flat rolled steel products now include a complete line of strip in all grades and sizes up to 24", and finished sheets up to 72".

Sincerely yours,

Harry P. Sheldon

President

Allegheny METAL CONTROLS CORROSION TRADE MARK THE SAFE METAL

ALLEGHENY STEEL COMPANY

lessly using Federal jobs and money as a whip to flog the Keystone state into obedience to the Roosevelt party." The statement pointed out that the Committee is composed of four New Dealers, Senators Lonergan, LaFollette, Schwellenbach and Minton and one Republican, Senator Austin, and of course any voice the Republican Senator might raise would be like a cry in the wilderness. The Committee says the Republican party will disclose substantiated evidence, in the way of weekly authenticated stories, "of the vicious and shameless campaign of corruption and coercion instituted under the auspices of the New Deal throughout the entire state." Its first statement deals particularly with alleged coercion of PWA workers and relief clients, claiming they are being compelled to register for the New Deal under threat of losing their jobs or being forced off relief rolls. It will be noted the statement speaks of the New Deal—it studiously omits mention of the Democratic party, thus recognizing a clear distinction between the two.

While these moves around the steel industry were being pushed forward, the irrepressible Major George L. Berry broke out with another blast in the course of which he dragged in steel executives as he does so often. Laying aside his empty title of "Coordinator" of Industry, the major came forth as President of Labor's "Non-Partisan" League, an offshoot of the CIO and set up to campaign for the New Deal, and created a class of "would-be dictators and pro-dictator forces" in which he included "the Liberty League and its duPonts, Mellons and steel kings." This is evidently a promotion for steel executives who heretofore by trite lexicon, have been mere barons, magnates or tycoons.

The major excoriated the group in the course of a choleric attack on Col. Frank Knox for the latter's views on a government labor policy in which the latter saw labor submitting to a dictatorship. But while the steel industry apparently considers the source of these attacks from the major and lets it go at that, he came in for a lashing at the hands of the Chamber of Commerce of the United States. However, let so-called big business espouse the cause of the New Deal and the major will eagerly embrace and cheerfully indorse the economic Royalists and their alleged transgressions about which he works up rages.

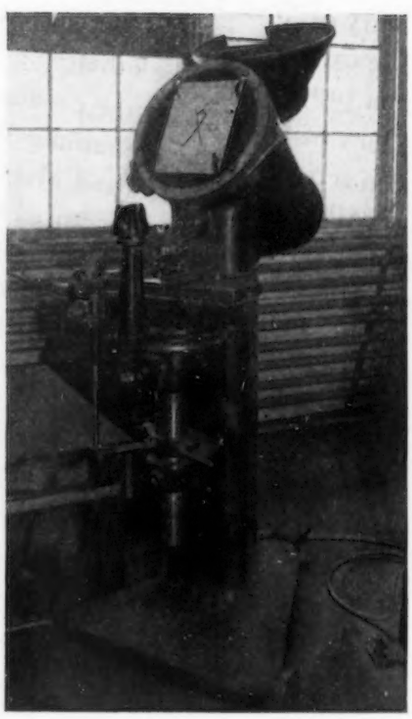
The Chamber, like other sources, panned the major for his careless handling of statistics. One fine example of his figure-juggling was the recent compilation on wages and productivity in the steel industry. The major jumbled together figures from miscellaneous steel consuming industries and dubbed the job as a study on the iron and steel industry. He added potatoes and tomatoes and by getting highly odorous and strong onions as a result he naturally wept over the sad result. A drab picture of wage conditions in the steel industry was painted.

Inaccurate Statistics

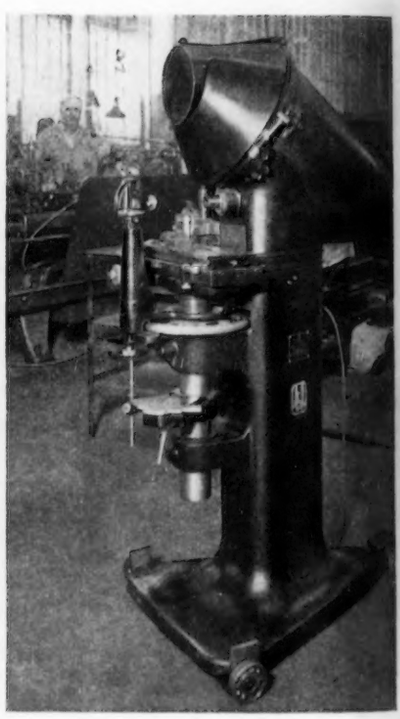
The Chamber refers to distortion of official figures, perfectly good figures, such as those issued by the Department of Commerce, and says all of the distortion cannot be laid at the door of unofficial agencies. "There is distortion of the same sort in material going to business men's organizations through the mails under official frank from the Coordinator for Industrial Cooperation," said the Chamber in its Washington Review for August 31. "This material is accompanied by such portentious language about the consequences to the public welfare to come from manufacturing industries failing to contribute 'to the support of the consuming market in proportion to the increase in their production'."

After pointing out that every week or two there is a new statement of this sort, the Chamber turns its attention directly to the statement on the "iron and steel

THREE APPLICATIONS



We found this Comparator in the EXPERIMENTAL DEPARTMENT. The operator was checking a form ground, non-involute shape against a master outline. This outline was drawn in their own engineering department on a sheet of bond paper, and held in place with spring hold-downs.



This machine was found on the PRODUCTION LINE. Here they were checking an eccentric piece against a master outline. The Comparator checks each part step by step, so that the finished product will bear an assured O.K.

industry. It cites the fact that figures arrived at are based on a census classification covering a general category which includes not only blast furnaces and steel mills but miscellaneous consuming lines. The Chamber says: "As a consequence, the statement presents figures which apparently show an average productivity per wage-earner in all these fields rising from $2,873 in 1919 to $37,718 in 1929, with only a 'trifling increase' in average annual wages from $1,450 to $1,568."

The Chamber statement continues:

"What significance such figures can have for diverse industries having in common only use of iron and steel it is difficult to perceive. Changing conditions in such a series of industries may in any event prevent comparability of figures at any ten-year intervals. If there were to be any real study in this field it should be devoted to blast furnaces and steel works, which employ about half of the workers usually ascribed to the general census classification and which more definitely constitute an industry respecting which data at ten-year intervals may have some significance.

Even a glance at the census data for blast furnaces and steel mills will disclose that between 1909 and 1919 the average productivity per wage-earner increased 8 per cent, whereas the average earnings of wage-earners increased 23 per cent, if the changes in the purchasing power of the dollar in the decade are taken into account. In the ten years following 1919 the average productivity per worker rose from $3,175 to $3,873,—if the methods of calculation used in the statement are followed. Meanwhile average earnings of wage-earners, if the same methods of calculation are used, rose from $1,709 to $1,744, the latter amount having 48 per cent more purchasing power than the amount received in 1919.

"Anything like an intensive examination of the record would disclose still more inconsistencies between the statements which are being issued and the true state of things."

Without inconsistencies and absurdities the campaign to smear steel and to muster votes, with particular concentration on Pennsylvania, would lose its appeal—if it has not already done so.

More Federal Jobs

The swarm of tax-eaters on the federal payroll continues to increase, despite purring assurance of no new taxes, reduction of government expenditures and other political balderdash. The number of civil employes on the federal payroll rose to 824,000 in August, an increase of 266,000 under the New Deal, most of which are non-civil service jobs.

Railroad Phenomena

Under the arresting head "Amazing but True," the Association of American Railroads has presented some interesting paragraphs about the railroad industry. Various highlights are as follows: Class I railroads spent $1,075,854,130 for maintenance work in 1935, the largest amount expended for this purpose in any one year since 1931; if all tubes and other obstructions are removed, the boiler barrel of one of the largest locomotives is large enough to permit any standard automobile to be driven through it with room to spare; by chemical treatment of water used in locomotive boilers, the life of fire box and flues has been doubled and in many instances trebled; more than 1,000,000 persons work directly for the railroad.

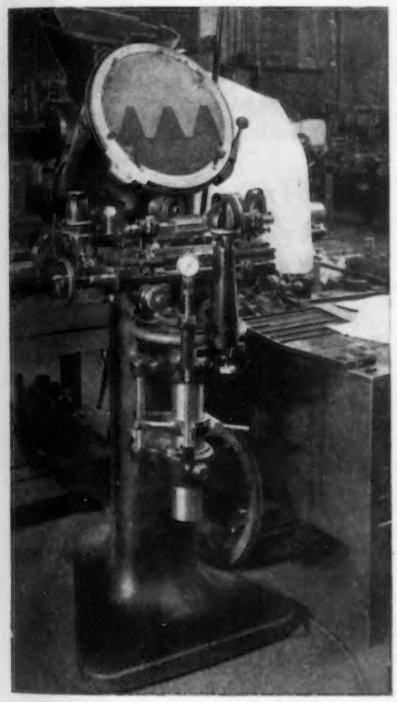
The association reports that in 1935 there were 865,098 railroad stockholders while the number of railroad bondholders is estimated at 1,000,000; nothing is said about the amazing paucity of dividends received by the economic Royalists the past few years and no mention is made of the altitudinous taxes with which the carriers are burdened.

The part that steel and machinery

IN A MODERN SHOP

THESE PEDESTAL COMPARATORS ARE GIVEN THE RUN OF THE SHOP

The pictures of the J&L Pedestal Comparators, shown on these pages, were snapped by our cameraman in a customer's modern shop . . . . Each machine was found in a different department . . . . They were found among the grinders, shapers, lathes, etc. . . . . Both foremen and operators run the Comparators. (Any shopman, after a few minutes instruction, can operate the machine with speed and precision) . . . . This manufacturer thought them so indispensable that he mounted them on wheels so that they now have the run of the shop . . . . Although the J&L Comparator is a precision instrument, it is a machine that belongs right out in the shop — *your shop.* (Vibration does not affect the image or the accuracy of the measurement). If you have not already discovered its merits, whether for projecting, measuring, or comparing objects, write for further information; or, better still, make an appointment to have one of our engineers call on you.



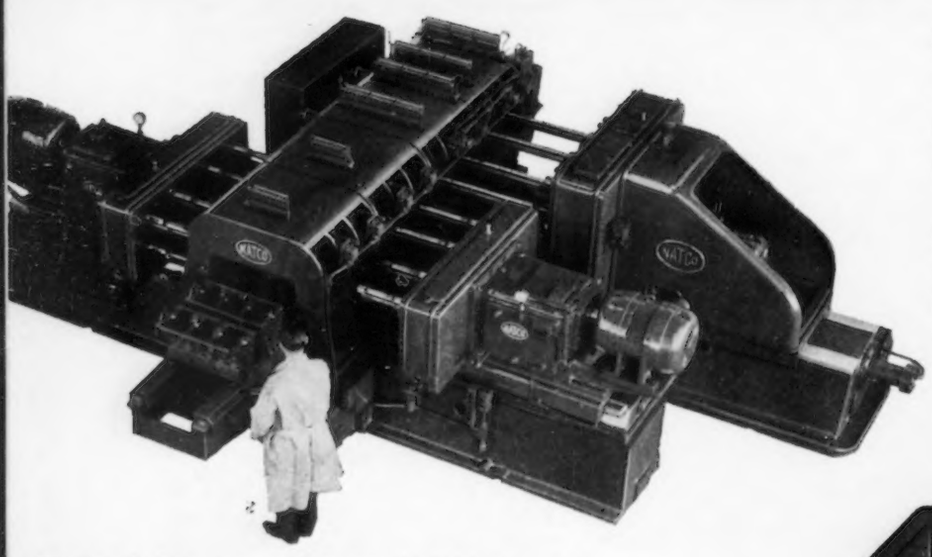
This Comparator is in the INSPECTION DEPARTMENT. On it are tested all sorts of tools and gauges. A tap was being tested as this photo was taken. (Note the attachment for reflecting objects that cannot be projected).

Jones & Lamson Machine Company

SPRINGFIELD, VERMONT U. S. A.

HERE ARE SEVERAL NATCO DRILLING, BORING and TAPPING MACHINES WHICH ARE.....

NOW BEING USED IN THEIR

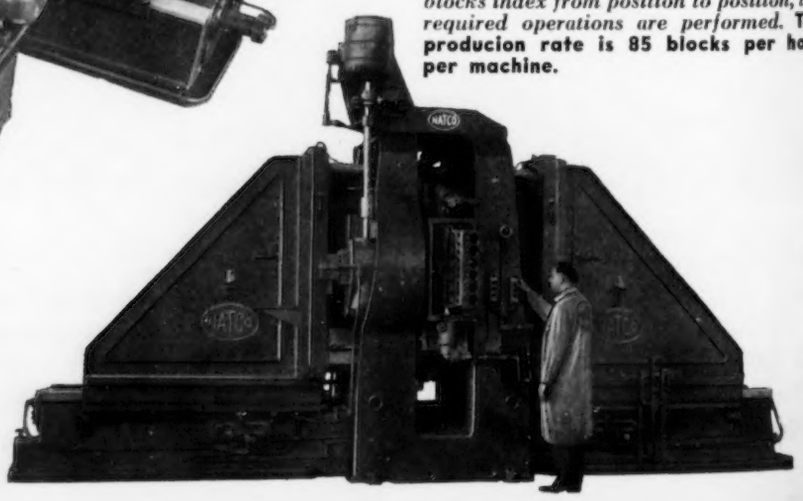


Illustrated above is one of the two NATCO 3 headed combination drilling and boring machines that are now being used in the Plymouth cylinder block line. This machine is being used to bore the cam and crankshaft bearing holes and core drill and counterbore the welsh plug holes in the Plymouth block.

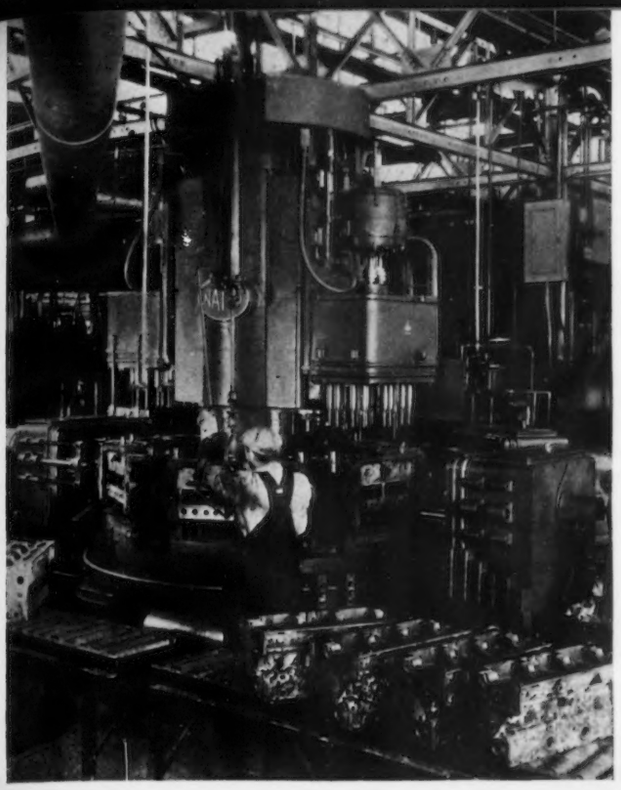
Each machine is built of NATCO HOLEUNITS, a special heavy duty hydraulic feed boring unit and a 5 position straight line indexing fixture arranged to hold 2 cylinder blocks in each position. As the blocks index thru the fixture the required operations are performed. Each machine requires one operator. **The production rate is 85 blocks per hour per machine.**

Shown below is one of two NATCO 4 headed combination drilling and tapping machines that are also used in the Plymouth cylinder block lines. This machine is being used to perform a total of 18 drilling, counterboring, facing, chamfering, countersinking and tapping operations on the Oil Pump Pad and Shaft Hole and the Distributor Pad and Shaft Hole in the Plymouth block.

Each machine is built of two large NATCO heavy duty hydraulic units and two tapping heads which are driven by a single reversing motor drive unit. A five position automatic indexing trunnion type fixture is built between the opposing heads. The fixture is arranged to hold one cylinder block in each position and as the blocks index from position to position, the required operations are performed. **The producion rate is 85 blocks per hour per machine.**



NATCO'S THE BUY FOR LOWER DRILLING, BORING AN



At the left is shown one of four NATCO center column station type machines now being used in the cylinder block lines at Plymouth.

Two of these machines are performing a total of 132 duplicate drilling, core drilling and countersinking operations (all holes) in the bottom and manifold side of the cylinder block. The other two NATCO machines are performing a total of 54 duplicate drilling and countersinking operations (all holes including valve holes) in the top and water jacket side of the Plymouth block. Only one operator is required for each machine. **The production rate is 85 blocks per hour per machine.**

NATCO
SOLVES YOUR HOLE PROBLEM

DAT PLYMOUTH
RCYLINDER BLOCK LINE

Over **1,500,000** cylinder blocks have passed thru the NATCO machines now being used by Plymouth. There are four station type machines (shown above), two cam and crankshaft hole boring machines (shown extreme left) and two combination drilling and tapping machines (shown at the left) in the lines. These eight NATCO machines are performing a total of 233 operations on 170 blocks per hour.

Similar equipment is now being used in the Detroit area by another prominent manufacturer of a low priced automobile. Also NATCO is now building another group of such machines for another division of the Chrysler Corporation. Surely this is ample proof of the wisdom of using NATCO Drilling, Boring and Tapping Equipment to lower your drilling, boring and tapping costs.

NATCO Engineers will be glad to study your drilling, boring and tapping problems. When one of our representatives calls, have him go over your complete "line". Without any sort of obligation on your part we will make a careful survey and lay our recommendations before you—then you be the judge. We believe that the machines shown are ample proof that the NATCO organization is qualified to engineer, build and put into service your complete "line" or a single machine, whatever your requirement may be.

* * *

Chicago Sales Office—2009 Engineering Bldg.
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The National Automatic Tool Company
RICHMOND, INDIANA, U. S. A.

NG AND TAPPING COSTS...SEND IN YOUR PRINTS TODAY

can play in conservation of natural resources is brought out in papers being presented before the Third World Power Conference which opened yesterday in Washington. Warning that the world supply of natural fuel and power resources is being depleted at an alarming rate, writers of papers revealed the outline of a concerted universal conservation movement. Specific recommendations include the development of more efficient machinery for the extraction and combustion of fuels, regulations of competition, the construction of great underground reservoirs for the storage of surplus oil, intelligent soil use looking to land and forest conservation, full use of water resources and reduction of waste of delivered power.

Symposium on Metals Used in Machinery

A SYMPOSIUM on corrosion resistant metals used in the design of machinery and equipment will be held as part of the American Society of Mechanical Engineers' annual meeting in New York, Nov. 30 to Dec. 4. The information presented is to be in compact form, of a practical nature and free from lengthy theoretical discussions. However, it will be sufficiently complete that when the different papers are assembled they will form a handy engineering reference on the subject of corrosion resistant metals.

The need for such a symposium was expressed by designing and operating engineers of the country who are constantly confronted with many problems on corrosion. Very few of the engineers have been able to spare the time to follow closely the rapid development of this type of information during the past few years. The papers to be presented are as follow:

"Introduction to Corrosion Resisting Metals," by Dr. F. N. Speller, National Tube Co., Pittsburgh.

"Alloys of Aluminum," by E. H. Dix, Jr., Aluminum Co. of America, New Kensington, Pa.

"Nickel and Nickel-Base Alloys," by F. L. LaQue, International Nickel Co., Inc., New York.

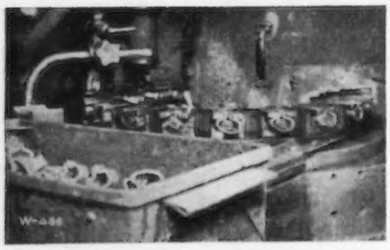
"Zinc in the Chemical Industries," by E. A. Anderson, New Jersey Zinc Co., Palmerton, Pa.

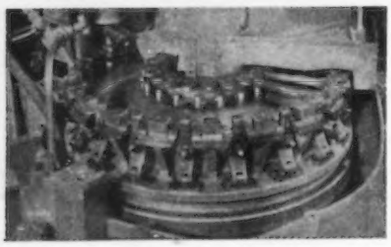
"Lead," by G. O. Hiers, National Lead Co., Brooklyn.

"Cast Iron in Chemical Equipment," by Dr. H. L. Maxwell, E. I. du Pont de Nemours Co., Inc., Wilmington, Del.

"Copper and Copper-Base Alloys," by R. A. Wilkins, Revere Copper and Brass, Inc., Rome, N. Y.

"Corrosion Resistant Steel (Stainless Type)," by J. H. Critchett, Union Carbide & Carbon Research Laboratories, Inc., New York.





Work done on Blanchard No. **16-A**

AUTOMATIC { **Chucking** **Sizing** **Unloading**

CHASERS ON No. 16-A AUTOMATIC GRINDER

Typical of small parallel sided pieces that can be magnetically chucked, these hardened chasers are ground at the rate of 3600 surfaces, 1800 pieces per hour, removing .004" stock per side The finish is excellent and size is held to ± .0004"

•

SMALL RACE RINGS ON No. 16-A AUTOMATIC GRINDER

The loading of multiple rows of pieces onto the continuously moving chuck gives very high production on such pieces as these small ball bearing races. At the left is seen the demagnetizer through which the unloaded work passes

Production 6000 pieces, 12,000 surfaces per hour

•

PISTONS ON No. 16-A AUTOMATIC GRINDER

These are held on the magnetic chuck, blocked by a high central ring, with a short pin entering the wrist pin hole of each piston to prevent turning If desired, a fixture to locate for height from wrist pin hole can be furnished Such a fixture has automatic clamping and does not require the magnetic chuck

•

MAGNETS ON No. 16-A AUTOMATIC GRINDER

This piece requires a mechanical fixture because of its shape and locating points. Hand clamping is used. 1/16" to 3/32" stock is ground off and production is 650 per hour The same fixture could be made with more stations and automatic clamping to give higher production

•

CONNECTING ROD FORGINGS ON No. 16-A AUTOMATIC GRINDER

The first operation on this forging is to grind one side flat, removing 1/64" stock, at the rate of 500 rods per hour. Location is on three points, clamping and releasing is automatic and since the machine has automatic size control the operator has only to place and remove the work.

Send samples and blueprints of small parts made in quantities and get the facts about Blanchard Automatic *Surface Grinders.*

The Blanchard Machine Co.
64 STATE STREET
CAMBRIDGE, MASS., U. S. A.

BLANCHARD

Offers Control Kits For Plating Baths

IN the plating industry there is an increasing demand for coatings of specified thickness. The plater is able to meet this demand most efficiently by always being confident of the composition of his bath. To simplify bath control, the Grasselli Chemical Co. has developed three test kits for the control of cadmium and zinc plating solutions and is now offering these units to the trade. These kits are applicable to the following solutions: The determination of cadmium in cadmium-cyanide plating solutions; the determination of zinc in alkali-cyanide or acid-zinc plating solutions; and the determination of the total sodium-cyanide content in zinc or cadmium plating solutions.

It is stated that these test sets are easy to manipulate. In organizations where centralized laboratory control is available it has been ascertained that the plater finds these testing units of great value, especially when the information they can give is required in a brief period of time.

Steel Exports in Further Rise — Imports Lower

STEEL exports in July rose to 296,738 tons from 294,951 tons in June. The increase was accounted for by a gain in exports of scrap, which went from 186,696 tons in June to 192,817 tons in July. Rolled and finished steel declined to 83,599 tons from 89,287 in June. Tin plate and taggers' tin showed a loss of 10,586 tons from the previous month.

Total exports for the first seven months this year rose to 1,928,329 tons compared with 1,889,469 tons in the corresponding period last year.

The iron and steel import trade dropped almost 20 per cent, from 59,910 tons in June to 47,940 in July. Imports of rolled and finished steel, however, rose to 18,339 tons from 14,358 tons the previous month. The loss in the total occurred in scrap, which dropped almost 10,000 tons.

Imports (In Gross Tons)

	July		Seven Months Ended July	
	1936	1935	1936	1935
Pig iron	12,496	5,519	110,003	59,005
Sponge iron	252	....	1,380	666
Ferromanganese[1]	1,386	5,962	13,403	28,490
Spiegeleisen	4,011	....	21,385	....
Ferrochrome[2]	....	....	3	1
Ferrosilicon[3]	28	38	425	467
Other ferroalloys[4]	275	....	426	1
Scrap	9,590	1,584	75,689	13,640
Pig iron, ferroalloys and scrap	*28,038*	*13,103*	*222,714*	*102,270*
Steel ingots, blooms, etc.	....	35	61	1,067
Billets, whether solid or hollow[5]	19	....	408	....
Wire rods	1,280	937	11,050	8,111
Semi-finished steel	*1,299*	*972*	*11,519*	*9,178*
Concrete reinforcement bars	364	721	2,073	1,529
Hollow steel bars	141	102	1,149	573
Merchant steel bars	2,453	2,253	21,095	13,191
Iron slabs	....	....	....	....
Iron bars	116	284	774	918
Boiler and other plate	....	79	52	246
Sheet, skelp and saw plate	1,319	681	11,856	4,663
Die blocks or blanks, etc.[5]	22	....	113	....
Tin plate	5	5	140	106
Structural shapes	3,233	3,122	28,660	20,603
Sheet piling	1,024	....	2,070	....
Rails and track material	859	819	4,405	2,463
Welded pipe	452	492	3,209	1,407
Other pipe	1,908	1,777	10,597	9,893
Hoops and bands for baling	777	2,211	865	3,954
Other hoops and bands	2,000	1,290	12,916	12,364
Barbed wire	949	1,390	10,168	14,746
Round iron and steel wire	464	224	2,800	2,408
Telegraph and telephone wire	1	3	34	20
Flat wire and steel strips	172	65	1,650	868
Wire rope and strand	220	138	1,449	1,058
Other wire	124	187	827	624
Nails, tacks and staples	1,659	1,841	14,462	10,333
Bolts, nuts and rivets	57	28	292	226
Horse and mule shoes	20	35	231	381
Rolled and finished steel	*18,339*	*17,747*	*131,887*	*102,574*
Malleable iron pipe fittings	50	....	70	46
Cast iron pipe and fittings	113	....	239	27
Castings and forgings	101	72	656	662
Total	47,940	31,894	367,085	214,757

[1] Manganese Content. [2] Chrome Content. [3] Silicon Content. [4] Alloy Content. [5] New classes. No comparable figures for previous year.

Exports (In Gross Tons)

	July		Seven Months Ended July	
	1936	1935	1936	1935
Pig iron	125	122	1,049	1,543
Ferromanganese and spiegeleisen	48	4	274	39
Other ferroalloys[6]	107	....	1,148	....
Iron and steel scrap	192,817	205,765	1,243,090	1,324,441
Tin plate scrap	1,195	2,957	10,020	22,124
Waste-waste tin plate	3,793	1,100	21,630	13,744
Pig iron, ferroalloys and scrap	*198,085*	*209,948*	*1,277,211*	*1,361,891*
Ingots, blooms, billets, sheet bars	4,215	1,718	11,098	29,998
Skelp	3,419	10,500	21,781	17,266
Wire rods	2,132	2,824	23,063	13,986
Semi-finished steel	*9,766*	*15,042*	*55,942*	*61,250*
Bars, concrete reinforcement[5]	471	....	1,812	....
Bars, other steel	3,929	6,145	28,365	33,242
Iron bars	98	44	754	658
Plates, iron and steel	6,892	3,608	38,503	22,778
Sheets, galvanized steel	3,781	7,229	32,201	45,101
Sheets, galvanized iron	168	343	850	1,066
Sheets, black steel	16,088	7,506	81,875	60,876
Sheets, black iron	536	278	4,431	3,212
Hoops, bands, strip steel	6,052	3,627	35,437	24,959
Tin plate and taggers' tin	16,010	9,639	147,716	63,751
Terne plate (including long terne)	301	46	2,401	1,403
Structural shapes, plain material	5,644	2,963	31,217	17,878
Structural material, fabricated	692	1,807	10,395	14,345
Sheet piling	59	....	1,599	....
Tanks, steel	1,283	716	14,051	3,696
Steel rails	5,207	7,611	39,264	26,783
Rail fastenings, switches, spikes, etc.	966	957	6,707	5,754
Boiler tubes	720	476	3,668	5,255
Casing and oil line pipe	2,094	2,648	13,013	19,311
Pipe, black and galvanized, welded steel	2,419	2,528	11,745	21,790
Pipe, black and galvanized, welded iron	532	132	2,272	1,979
Plain wire	3,702	2,553	26,330	21,229
Barbed wire and woven wire fencing	3,367	3,905	19,312	19,483
Wire cloth and screening	134	100	640	614
Wire rope	291	329	1,975	2,537
Wire nails	772	1,277	4,774	6,148
Other nails and tacks	230	412	1,866	2,194
Other wire and manufactures	460	620	2,814	3,081
Bolts, nuts, rivets and washers, except track	464	536	3,588	3,806
Other finished steel	237	88	1,338	793
Rolled and finished steel	*83,599*	*68,123*	*570,913*	*433,722*
Cast iron pipe and fittings	2,655	870	9,545	8,259
Malleable iron screwed fittings	286	249	1,920	1,839
Carwheels and axles	1,294	430	4,180	11,835
Iron castings	455	1,344	4,252	5,735
Steel castings	374	371	1,823	1,628
Forgings	224	405	2,543	3,310
Castings and forgings	*5,288*	*3,669*	*24,263*	*32,606*
Total	296,738	296,782	1,928,329	1,889,469

July Imports of Iron and Manganese Ores

(In Gross Tons)

	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1936	1935	1936	1935
Canada	2,802	1,560	396	....
Cuba	22,000	22,500	....	....
Chile	109,700	66,000	....	....
Spain	....	....	....	....
Norway	6,661	15,525	....	....
Sweden	46,523	....	....	....
French Africa	....	....	....	....
Russia	....	22,800	4,428	4,161
India	....	....	6,496	2,240
Brazil	....	....	3,750	....
West Africa	....	....	5,838	9,669
Other Countries	10,554	25,358	....	56
Total	198,240	153,743	20,908	16,126

July Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	July		Seven Months Ended July	
	1936	1935	1936	1935
United Kingdom	1,050	1,148	4,786	12,499
British India	4,935	3,257	34,082	14,752
Germany	150	50	3,819	150
Netherlands	2,231	276	42,020	19,041
Canada	2,902	463	8,700	6,052
France	....	....	....	50
Belgium	....	....	529	100
Norway	81	25	1,679	1,787
Sweden	....	100	374	547
Russia	1,147	200	13,605	3,173
All Others	....	....	409	854
Total	12,496	5,519	110,003	59,005

..PERSONALS..

JAMES S. HEARONS has been appointed assistant manager of sales, railroad division, Inland Steel Co., Chicago. Mr. Hearons attended school in the East. He began work as a special apprentice for the Erie Railroad in 1906, and later became associated with the Illinois Central Railroad. During the World War he served in the A.E.F. as Captain in the engineering division. Prior to his Inland appointment, Mr. Hearons was assistant to the president of the Clark Equipment Co., specializing in railroad sales.

❖ ❖ ❖

ALEXANDER A. MOTHERWELL, former vice-president and general manager of the Chevrolet forging plant, is now superintendent of operations of the Detroit Forging Co., Detroit. In the past 45 years Mr. Motherwell has planned and supervised the construction of nine forging plants, valued at $40,000,000, including the Buick and Chevrolet units at Flint and Detroit. He was associated with General Motors Corp. for 21 years. At the request of William C. Durant he joined the Buick division in 1907, when it was located in Jackson.

J. S. HEARONS

For several years he was general foreman of the Carnegie Steel Co.'s forge plant at Homestead.

❖ ❖ ❖

WALTER GEIST, general representative of the Allis-Chalmers Mfg. Co., Milwaukee, and designer of the "Texrope" power transmission drive system on which it holds patents, has sailed for Europe in connection with negotiations for the company with about 15 manufacturers in England and France for licenses to manufacture the drive abroad. A number of manufacturers in the United States already hold licenses. Mr. Geist is accompanied by HAROLD W. STORY, vice-president and general attorney of the company.

❖ ❖ ❖

MICHAEL F. TIGHE, Pittsburgh, has resigned as president of the Amalgamated Association of Iron, Steel and Tin Workers, effective Dec. 31. Although he had previously announced himself as a candidate for reelection, Mr. Tighe recently decided to withdraw his name. According to Mr. Tighe, who is 77 years old, the only reasons for his retirement are his

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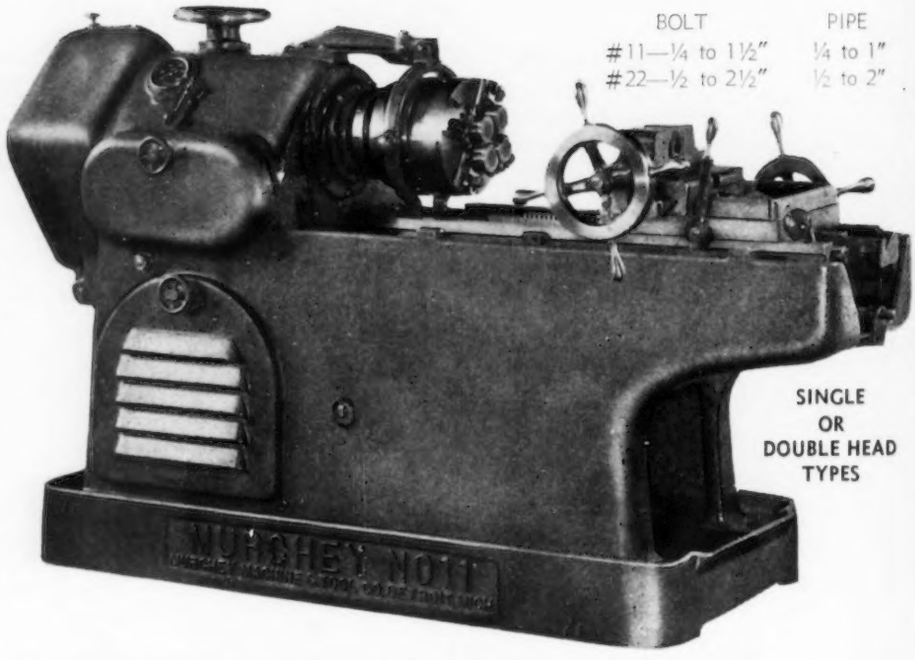

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health and a desire to enjoy a well-earned vacation. Active in the Amalgamated Association for more than 57 years, he has been its president for 17 years. After the contract was negotiated between the Committee for Industrial Organization and the Amalgamated, by which the latter would be used as a vehicle for the Steel Workers Organizing Committee, John L. Lewis' backers took the center of the stage, and, while Mr. Tighe was a member of the SWOC, he was not very active in the movement.

❖ ❖ ❖

J. E. BUCKINGHAM, who has been engaged in railroad sales work for the past 14 years for the Worthington Pump & Machinery Corp., during the last five as western regional manager, railroad division, has been elected vice-president in charge of sales for the western district by the Lincoln Electric Rail-

J. E. BUCKINGHAM

way Sales Co., Cleveland. He will make his headquarters at 310 South Michigan Boulevard, Chicago. Mr. Buckingham began his railroad career in 1900 with the Union Pacific system. He has also been identified with the Baldwin Locomotive Works and the Standard Steel Co.

❖ ❖ ❖

S. E. SJOGREN, who has been identified with the Detroit office of the Columbia Tool Steel Co., Chicago Heights, Ill., since 1927, has been appointed district sales manager, with headquarters at 1718 Howard Street, Detroit. As a young man Mr. Sjogren served a full-time die maker's apprenticeship and was associated for a time with the Chevrolet Motor Co. and the Cadillac Motor Car Co.

❖ ❖ ❖

WILBUR C. SCHADE has been appointed manager of the alloy castings department of Ross-Meehan Foundries, Chattanooga. He was formerly vice-president and general manager of the Phoenix Iron Works Co. Since 1928, he has specialized in the development of alloy irons and steels in cast form.

❖ ❖ ❖

JAMES R. BUCHANAN has been added to the field metallurgical staff of the Detroit district sales office of the Union Drawn Steel Co., Massillon, Ohio. He is a graduate of Michigan State College and was formerly associated with the

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Indianapolis, Ind.—J. W. Mull, Jr.
Los Angeles, Calif.—Almquist Bros. & Viets
Milwaukee, Wis.—Polhemus Company, Inc.
New York, N. Y.—H. E. Eaton Company
Philadelphia, Pa.—H. E. Eaton Company
Pittsburgh, Pa.—J. W. Mull, Jr.
Motch & Merryweather Machinery Co.
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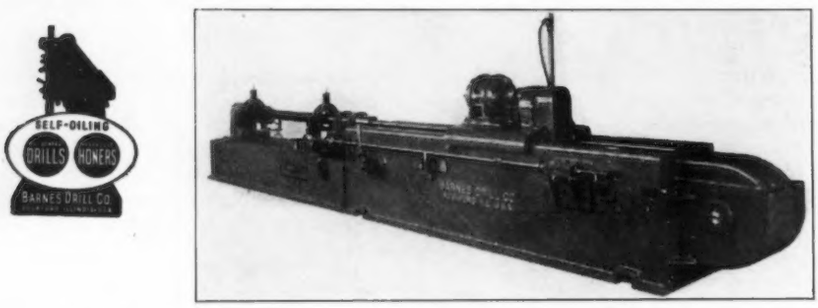
Toledo, Ohio—W. F. Haverstock
J. W. Mull, Jr.
Tulsa, Okla.—Brammer Machine & Tool Service



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metallurgical department of the Chevrolet Motor Co.

❖ ❖ ❖

RALPH FISHER, formerly of the Houdaille-Hershey Corp., has been appointed sales manager of the stamping and bumper divisions of the Eaton Mfg. Co., Detroit.

J. W. GRANT has been placed in charge of engineering and design in connection with pickling tank and general acid tank construction, by the Atlas Mineral Products Co., Mertztown, Pa. He is a graduate of Carnegie Institute of Technology.

THOMAS LORD has been made sales engineer in the Detroit territory for Foote Brothers Gear & Machine Corp., Chicago, succeeding C. A. HAYWARD.

❖ ❖ ❖

FREDERICK O. SCHRAMM has been appointed district sales agent for New York and vicinity by the Pittsburgh Steel Foundry Corp., Glassport, Pa. His office will be located at 11 West 42nd Street.

❖ ❖ ❖

FRANK W. LADKY has been appointed sales agent in Wisconsin, by the Allegheny Steel Co., for the sale of hot and cold rolled strip steel manufactured by the West Leechburg Division of the company. Mr. Ladky, who formerly represented the Acme Steel Co. in this same territory, will have headquarters in the Bankers Building in Milwaukee. DAVID A. GARLICK, formerly with Bliss and Laughlin, Inc., has associated himself with Mr. Ladky.

❖ ❖ ❖

A. MAXWELL JONES, for 30 years in the employ of the Buffalo Bolt Co., Tonawanda, N. Y., has been named general sales manager of the company. Mr. Jones, who is a graduate of John Marshall Law School, Chicago, started his business career as a junior salesman

A. M. JONES

for the Buffalo Bolt Co. in the Chicago office in 1908. He later became assistant district manager in Chicago, and subsequently went to St. Louis, where he opened the office as district sales manager. He later returned to the home office of the company as assistant general sales manager, holding this post until his latest promotion.

(CONTINUED ON PAGE 118)

...OBITUARY...

GEORGE E. OSBORN, vice-president and general manager of the Chicago plant of the Lamson & Sessions Co., Cleveland, died suddenly in Chicago on Aug. 28, aged 44 years. He had been identified with the company since 1914 and formerly had charge of sales in

G. E. OSBORN

Iowa and Missouri River territory. He was placed in charge of the Chicago plant in January, 1935.

❖ ❖ ❖

DAVID H. JOHNSTON, office manager of the Detroit district sales office of the Union Drawn Steel Co., Massillon, Ohio, died at Whitehall, Mich., on Aug. 26, aged 58 years.

❖ ❖ ❖

WILLIAM S. ROE, president of the company of the same name, Newark, N. J., died of a heart attack at Springfield, N. J., on Sept. 3, aged 58 years.

❖ ❖ ❖

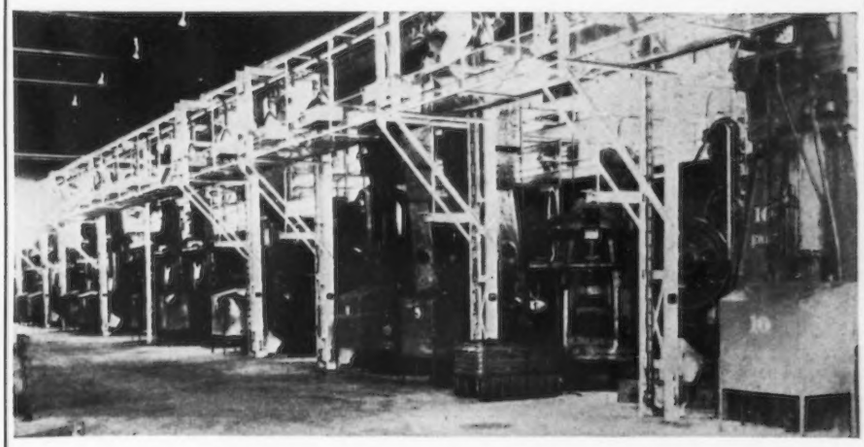
WILLIAM O. MCKINNEY, president and treasurer of the McKinney-Harrington Conveyor Co., North Chicago, Ill., died recently of a heart attack at Victory Memorial Hospital, Waukegon, Ill.

❖ ❖ ❖

ANDREW T. MERRIMAN, long Cleveland district sales manager of the American Steel & Wire Co., died Sept. 5, aged 64 years. He was born in Chicago, where he entered the employ of the company more than 30 years ago and was transferred to Cleveland in 1909.

Aircraft Production Shows Large Gain

PRODUCTION of aircraft in the first half of 1936 rose to 1363 units compared with 851 in the corresponding period of last year, according to the Bureau of Air Commerce, Department of Commerce. In the calendar year 1933 production was 1324. In the light plane classification production increased from 393 in the first half of 1935 to 622 in the first half of the present year. The total produced in the January-June, 1936, period, included 764 domestic civil aircraft, 407 airplanes built for military delivery and 192 for export. Of those for domestic civil use, 656 were monoplanes and 108 biplanes.



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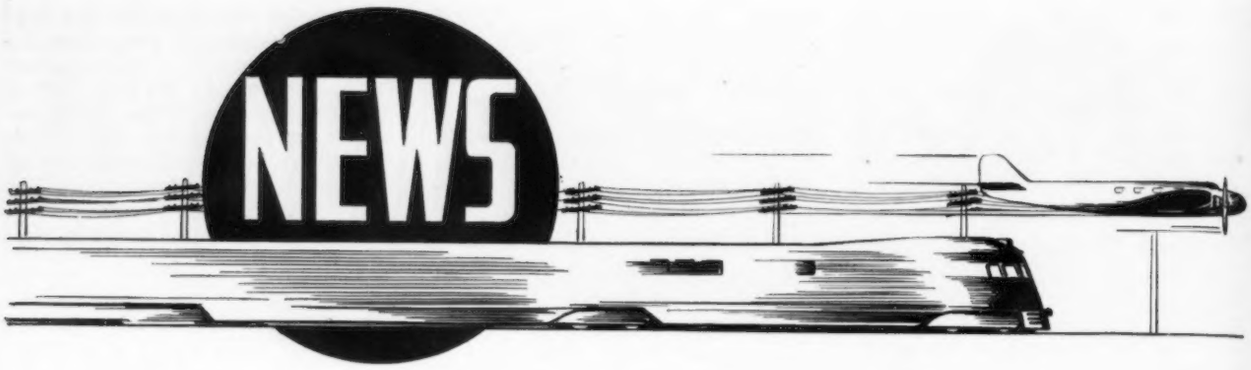

Steel Industry Undergoing Modernization That will Continue for Two or Three Years

WHILE the steel industry has already invested a considerable amount of money in new equipment, plans are going forward at the present time to add to these investments and there is a certainty that repairs, modernization and new installations over the next few years will greatly exceed those made in any period in its history.

Capital expenditures during the past several years have been concentrated on finishing mill equipment. Uppermost in the mind of steel executives have been plans for and installation of continuous strip and sheet mills. Now that this phase is more or less in the final stages, companies are directing their full attention to improvements in the entire plant set-up from blast furnace to finishing mill.

Obviously, poor earnings and lack of orders during the past five or six years have been sufficient reason for a negligible amount of investment on projects other than finishing mills. The stimulus for the latter resulted mainly from a competitive situation among steel producers. Now that companies are emerging from a period of history-making deficits, and hope has appeared that earnings are on their way to recovery, practically every steel mill in the country is executing and planning improvements. This state of affairs is gratifying to operating executives, who have been faced with extremely difficult problems within the past several months, owing to a tremendous increase in steel production over depression lows.

Many changes in the steel situation involving production and consumers' requirements, have occurred since 1929. There has been an increase in demand for higher quality steel products, as well as a delivery service unheard of in 1929. With present equipment, coupled with higher taxes, higher labor rates, and desire on the part of producers to satisfy their customers' needs, the cost of making steel has increased greatly. Changes now contemplated are a necessity in order that the industry may produce the best steel at the lowest cost.

Blast Furnaces to Be Rebuilt

Changes will be made in blast furnace departments. Some companies have rebuilt blast furnaces, applying modernizations with the result that output has been increased far beyond the point for which the original furnace was constructed. This activity is by

NEWS AND MARKET INDEX

Personals	72	Philadelphia Market	105
Obituary	75	Non-ferrous Market	109
Pig Iron Production for August	91	Fabricated Steel	108
Summary of the Week	93	Scrap Market and Prices	110-111
Pittsburgh Market	94	Finished Iron & Steel Prices	112-113
Comparison of Prices	95	Warehouse Steel Prices	114-115
Chicago Market	97	Pig Iron & Raw Material Prices	116
Cleveland Market	99	Machine Tool Activity	117
New York Market	102	Plant Expansion & Equipment	124

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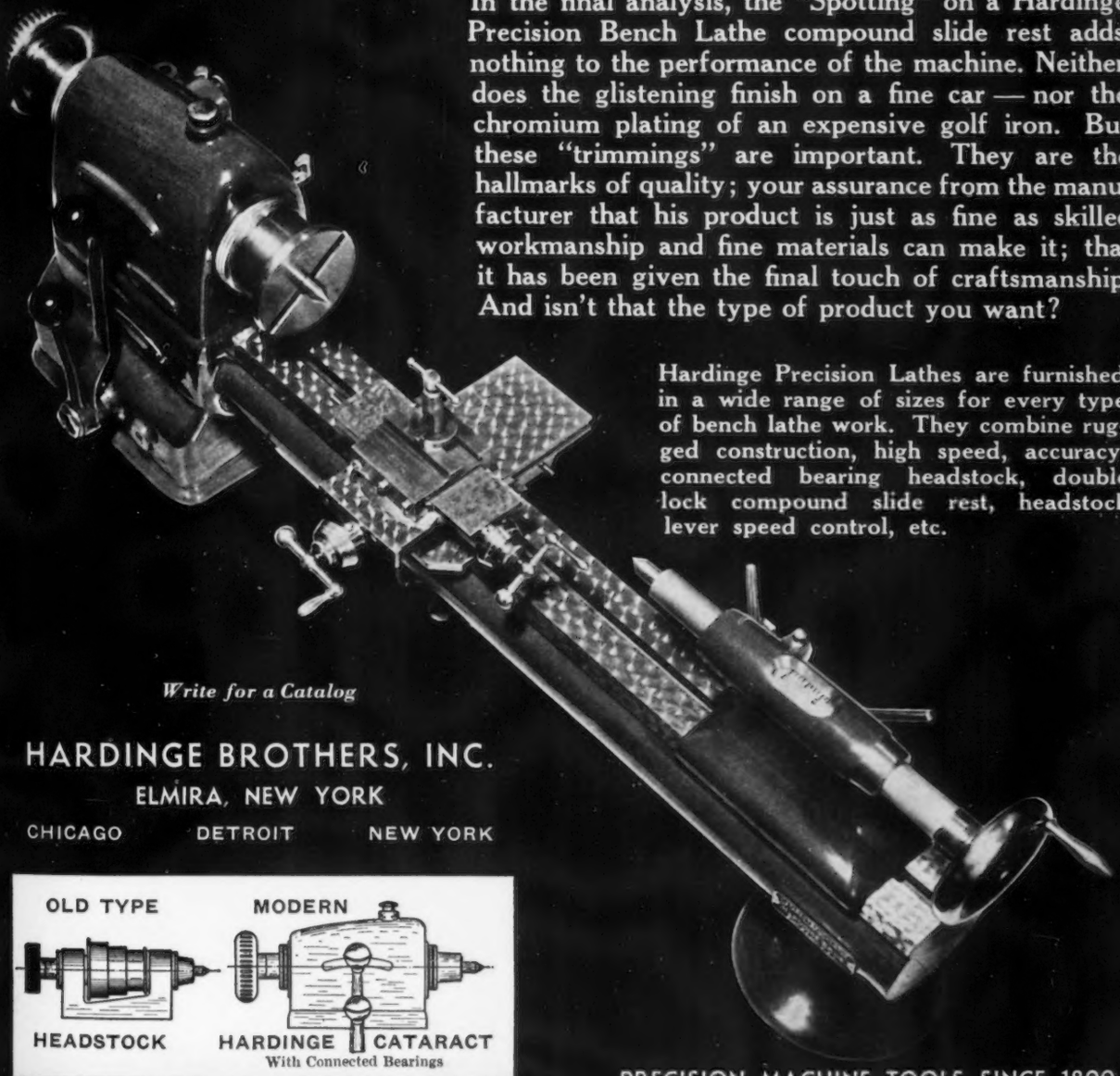

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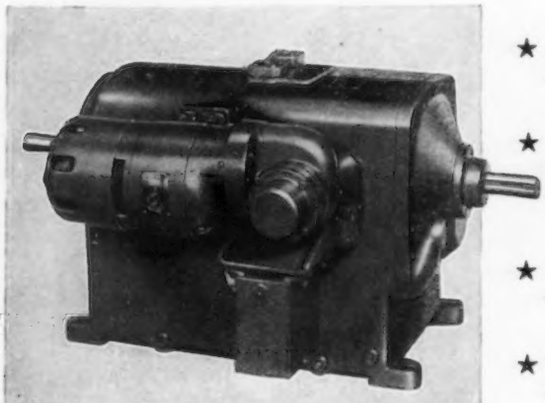
no means at an end. There are a great number of furnaces which have been inactive since 1929, a great percentage of which will never be operated again. The best of these will be stripped and rebuilt with modern improvements. Obviously this will mean such changes as the latest developments in refractory material as well as the latest improvements in the form of blowers, etc. Obsolete blast furnaces will be dismantled and used as scrap. One thing which may hasten the dismantling of such plants is the acute shortage of scrap owing in a large measure to the exceptional exports amounting to over 5,000,000 tons in the past few years. Another phase of modernization closely allied with the blast furnaces will take place in the by-product coke department. When these coke facilities were built, they were tuned to the pig iron capacity at that time. More modern productive capacity is now needed. The tight situation with regard to furnace coke, coupled with the reluctance to give up substantial domestic outlets, will obviously hasten changes in by-product coke plants. Considerable amount of investment will be necessary to put remaining units in good working order and those units now in operation will be renovated to a higher degre of efficiency.

Steel Making Departments Also to Be Overhauled

The next phase of readjustment in the steel industry points to a complete overhauling of the steel making departments. Changes in this department have been badly needed for a long time, but lack of capital and light demand for steel precluded changes of this type until such time as it was fairly certain they would be justified. There are at the present time a number of open hearths inactive since 1929 which will be completely dismantled due either to their obsolescence or to their location with regard to finishing operations. Within the past few weeks some companies have embarked on a rebuilding and modernization program for their steel making departments. In those cases where foundations and locations are satisfactory, furnaces will be completely rebuilt and equipped with the latest in design and construction.

There is little doubt that extremely old-type furnaces will be completely dismantled and new ones built either at the same location or at a spot which will give more efficient handling of the metal. As a possible example of how tremendous such a program undoubtedly will be, one might look at the operating figure in the Pittsburgh district. Operations over the past several weeks have been around 70 per cent of capacity. It is doubtful if that district could attain operations of more than 85 per cent of theoretical capacity. Not only would this rate mean the inability to use the remaining 15 per cent, but it would also necessitate pushing a great percentage of the open hearths almost to the breaking point.

Many of the new finishing mill installations will undoubtedly require a rearrangement and a better balance between the steel making department and the finishing department. There have been occasions during the past several weeks where the cost of handling steel has sky-rocketed due to the unbalance between the two departments. In some cases it has been necessary to switch ingots from one plant to another, thereby increasing costs considerably. This program indi-



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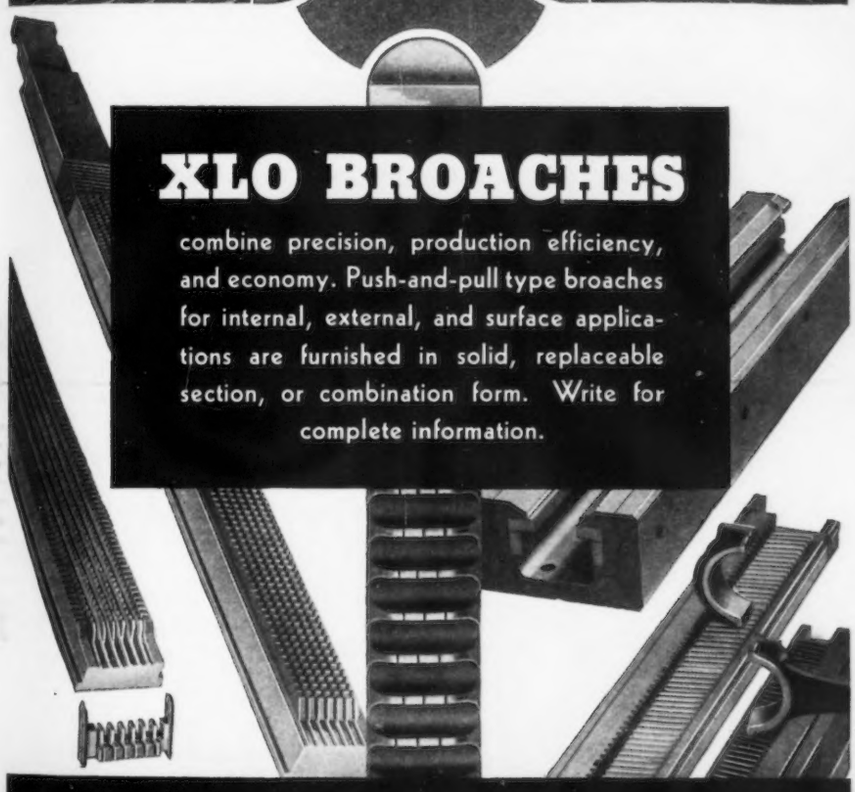

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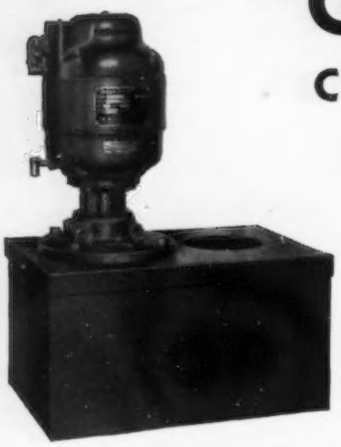

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cated in the steel works department will necessitate a large outlay of money not only for the major items involved in such projects, but for a host of small products which go into the total make-up of open hearth furnaces.

Many Soaking Pits Obsolete

Turning to soaking pits, it is found that a considerable number of them were built years ago when more emphasis was laid on quantity than quality. With the present-day consumer requirements, it has become mandatory not only to improve the operation of soaking pits, but to increase the capacity. They are truly the bottle neck in the steel industry. The increase in the amount of high quality steels has necessitated improvements in heating practices to such an extent that methods prevalent six or seven years ago will not fill the bill today. Better temperature control and necessity for keeping oxidation to the minimum are only two of the many problems. A host of others, involving repairs, modernization and replacement, are being considered by many steel companies at the present time. One of the greatest difficulties which many mills have to overcome is lack of space.

Although obscured for some time due to the intensive interest shown in large expensive continuous strip mills, improvement plans in the blooming mill department are now coming to the front. All indications point to a further electrification of blooming mill facilities. Those steam driven blooming mills which are now more or less obsolete, will be abandoned and new up-to-date mills constructed in their place. On installations which have occurred comparatively recently, changes will be made to bring operations up to the efficiency of present-day requirements. The trend is already toward two-high reversing electrically-driven blooming mills which have a great diversity of operation. Modern improvements are such that this type of mill can easily supply quality blooms, billets or slabs for any of the ultra-modern finishing equipment now installed or to be installed. It is essential that if the finishing equipment is to be of the latest type, blooming mill machinery must be of equal efficiency if a high quality finished product is to result. The experience of some companies which have installed new blooming mills within the past several years has proved that auxiliary equipment such as pumping, oiling and greasing systems, manipulator, shears, and hot beds, are equally as important in the final efficiency of operation as the mill proper. Since the trend is definitely toward further electrification, it naturally follows that large expenditures will be made on power house equipment.

More Continuous Mills to Be Built

Passing to the finishing mills, lengthy mention of continuous strip mills can probably be omitted, since so much has been written on them in the past three or four years. It can be said, however, that more of them will be built and the trend toward a mill which will produce not only sheets and strip but light plates is already here. One large continuous mill scheduled for completion this year will be capable of rolling not only sheets and strip but plates as well, which brings up an interesting point that the present capacity of continuous mills is not greater

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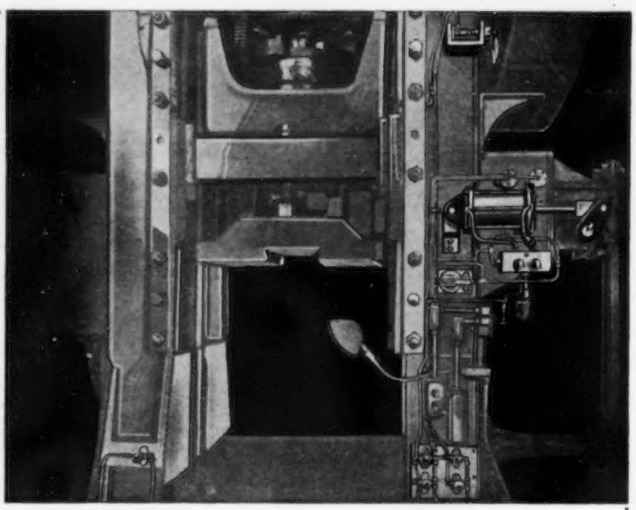

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than the demand would indicate. These mills are not only replacing hand mill capacity but to some extent will replace capacity of obsolete plate mills. New uses will also necessitate increased productive facilities. In order to carry out the idea of greater efficiency and lower cost, it is certain that up-to-date changes will be made on those continuous mills erected a few years ago. Overshadowed by the intensive interest in continuous mills have been the other type finishing mills such as bar and shape mills. While quite a few modern installations of this type have occurred, for the most part this phase of the finishing capacity has probably been neglected. Considerable time, money and effort will be expended within the next few years to bring these mills up to the efficiency of the continuous mills. Such programs will call for complete rebuilding of many mills and modernization including electrification of those which are still in good shape. If the cost factor is too high and the location unsatisfactory, old-type mills will be demolished and new ones put in their place. Those mills which are in the best position with reference to steel quality and efficiency of operation, will be in a preferred position.

The plans described above are not merely wishes on the part of management. Some of this modernization program has been completed, some is now in the process of being awarded, and the great majority of it will take place within the next two or three years. The whole setup is predicated upon the premise that steel making costs must come down. Especially is this true in view of increasing taxes, labor costs and strict consumer requirements. There is only one way to attain this goal; modernization from top to bottom. During the depression, pent-up demand for capital expenditures within the steel industry itself had to wait until customers of the steel industry saw fit to purchase the mills' product in enough volume to enable the latter to go ahead with needed changes.

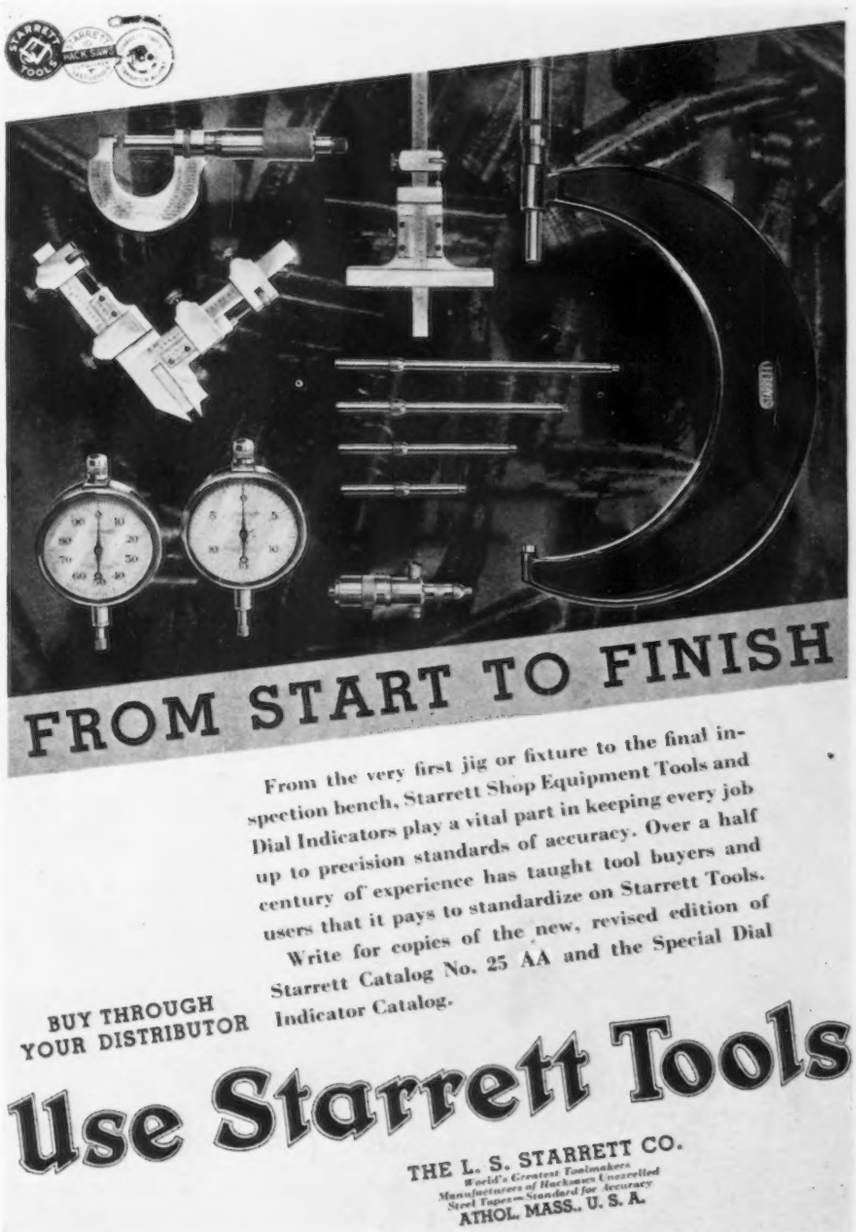
The August issue of *World Machinery News*, a Department of Commerce publication, issued monthly by the Machinery Division, Lewis M. Lind, acting chief, Washington, consists of 11 pages of informative and statistical review covering industrial sales relationships with many foreign countries. Standard charts supply period comparisons in eight machinery groups, including power-driven, metalworking machinery.

Issues New Specifications For Structural Steel for Buildings

A NEW standard specification for the design, fabrication and erection of structural steel for buildings has just been issued by the American Institute of Steel Construction. Provisions have been incorporated in accordance with the recommendations of a committee on specifications consisting of F. T. Llewellyn, chairman, research engineer of the United States Steel Corp.; G. H. Danforth, contracting engineer, Jones & Laughlin Steel Corp.; H. W. Fitts, vice-president, New England Structural Co.; Jonathan Jones, chief engineer, fabricated steel construction, Bethlehem Steel Co.; Aubrey Weymouth, chief engineer, Post & McCord, Inc.; F. H. Frankland (ex officio), chief engineer, A.I.S.C., and C. F. Goodrich (chairman, subcommittee on unit stresses), chief engineer, American Bridge Co.

Among the important changes in the standard specification are allowable unit stresses which accord in general with a basic stress of 20,000 instead of 18,000 lb. per sq. in. in tension.

With a view to conservatism, the first specification of the American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Institute of Steel Construction issued in 1925 prescribed a basic unit stress of 18,000 lb. At that time the minimum yield point of standard structural steel was 30,000 lb. per sq. in. Since that time several changes have occurred that affect the situation.

1. The minimum yield point of the present day standard structural steel has been raised to 33,000 lb. per sq. in., with an increase in the ultimate strength from 55,000/65,000 lb. to 60,000/72,000 lb.

2. The principal foreign countries of the world have increased the allowable basic unit stress permitted for comparable steel to approximately 20,000 lb.

3. Knowledge has been highly developed and current practice has been standardized in the structural steel industry, with a consequent increase in the dependability of structural steel to meet given conditions of use.

In 1934 the institute authorized its committee on specifications to consider the advisability of increasing the basic unit stress. After a careful canvass of the situation the committee decided to recommend the use of 20,000 lb. per sq. in. basic stress coupled, however, with more rigid requirements of design and fabrication, and these requirements have now been incorporated in the revised specification. The committee believes the net result will prove not only to be economical and at the same time entirely safe, but to result in a more scientific use of structural steel.

Sections rewritten relate to bearing pressure on rivets, design of plate girders, and web crippling of beams.

To the industry the institute is making a free distribution of the new specification, but duplicate copies may be had only upon payment of the cost production.

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U. S. Tin Consumption 47% of Total

REPRESENTING 47 per cent of the world total, United States consumption of tin during the 12 months ended June of the present year was 69,644 tons, according to the International Tin Research Council, which reports that apparent consumption throughout the world during that period was 147,720, an increase of 16.4 per cent over the consumption of 125,881 during the preceding 12 months.

The United States consumption in the 1935-36 period, says the report as disclosed by the Minerals and Metals Division, Department of Commerce, was an increase of 35 per cent. British consumption, amounting to 21,789 tons, registered an advance of 2.1 per cent. Consumption in France and Soviet Russia showed increases of 10.6 and 25.1 per cent, respectively, while German consumption was down 10.6 per cent. Germany and Spain were the only two important consuming countries which showed declines.

For the 12 months ended June, 1936, world production of tin plate amounted to 3,332,000 tons, compared with 3,011,000 tons in the preceding year. The quantities of tin used in tin plate manufacture totaled 54,300 tons and 48,900 tons, respectively.

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Jones & Laughlin to Build "Pilot Plant"

MAKING a new approach to the use of research by the steel industry, the Jones & Laughlin Steel Corp. is to construct a miniature steel works for developing discoveries of its research engineers.

This experimental plant will be equipped with actual steel making units on a small scale capable of duplicating operations in the big mills and will be part of the research department of the company. In the past it has been the general practice to turn over the discoveries of research engineers to the regular manufacturing departments for testing and developing. Oftentimes such procedure was not feasible owing to interruption of regular production schedules. At other times experiments were not adequately exploited, but under this new system Jones & Laughlin engineers will develop and test their ideas in the new pilot plant, where they will have entire control over the miniature steel making equipment, which will include an iron cupola, an open-hearth furnace, a bessemer converter, a blooming mill, and various finishing devices.

In the pilot plant the technicians will be able to start with the raw material, taking it step by step through the blooming, rolling and shaping operations, thus turning out steel products on which a complete and accurate history will be available. Research ideas will be thoroughly tested under a variety of operating conditions not possible in the regular manufacturing departments. This latest set-up on the part of the steel company will represent an intermediate step between the research department and the manufacturing departments, a situation long desired by both metallurgical and operating officials. An arrangement of this kind will enable the company to completely prove or disprove the value of research discoveries before submitting them to the operating departments for practical application. It will also enable the company to anticipate the demands of its customers for improved steels to meet any requirements in the operating procedure and will give the research engineers further opportunity to assist in developing wider markets for the steel products.

H. K. WORK

In addition to housing the pilot plant, the new building will accommodate the present research staff and equipment. The building will be completed and in operation by the end of the year. Additional machines are to be purchased, so that the research department will include practically all of the facilities now known to science for testing and examining steel. The present staff of technicians will be enlarged and the entire research department, including the pilot plant, will be under the direction of Harold K. Work, newly appointed research director of the Jones & Laughlin Steel Corp.

Before coming to Jones & Laughlin, Mr. Work was with the Aluminum Co. of America, having started in its research department at the Buffalo, N. Y., plant in 1929. In 1931 he was made head of the electrochemical division of the Aluminum Research Laboratories at New Kensington, and in 1934 chemical engineer of the jobbing division.

Mr. Work was graduated from Columbia University in 1923 with a B.A. degree and in 1925 received his degree in chemical engineering. He then went to the Mellon Institute of Industrial Research of the University of Pittsburgh, where, in 1929, he was awarded a Ph.D. degree.

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Railroads Withdraw A Rate Increase

RAILROADS have filed with the Interstate Commerce Commission a short notice, six section, application to withdraw proposed freight rate schedules which were to have become effective Sept. 15 in what is known as the bridge arbitrary territory, which extends 170 miles west from the Mississippi River and north of the Wisconsin limits of the Illinois freight committee territory. The schedules as filed would have eliminated the commodity classification within the bridge territory, retaining only the class rates, which in effect would raise all iron and steel rates to the above territory by from 4c. to 7c. on shipments from Chicago base.

The territory which would have been affected lies principally in Missouri, Iowa, and Wisconsin. Bridge territory and its class and commodity rates were established under the Western class rate case, 17,000 part 2, in order to avoid a

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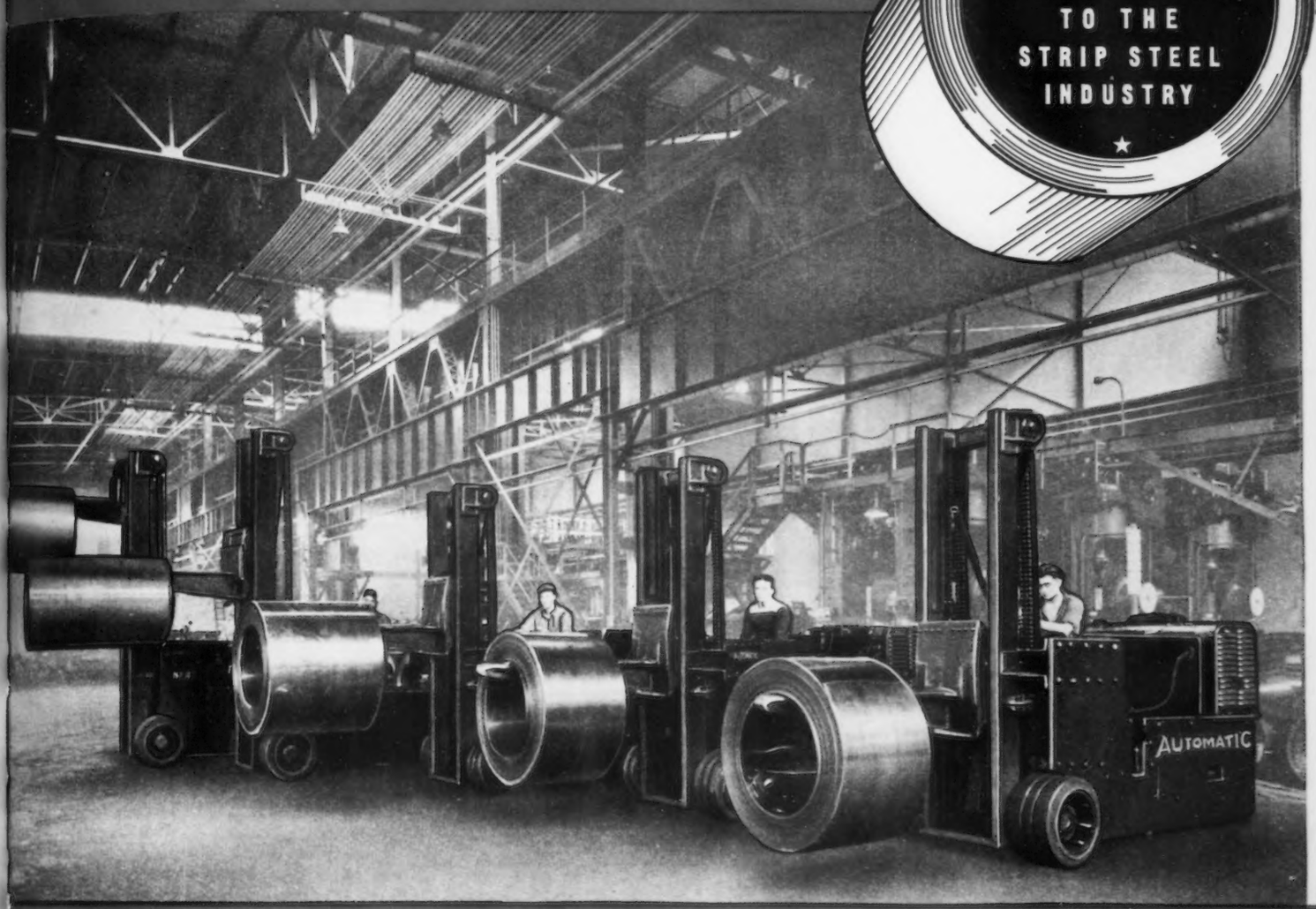

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sharp hump in freight rates at the western and northern borders of the Illinois freight committee territory. The rates then established provided a graded scale which increased from the Illinois committee territory border westward and northward across the 170-mile strip, affording consumers within that area an opportunity to compete with users within and near the borders of the Illinois committee territory.

The changes proposed would have applied from all points of iron and steel origin east of the territory affected. The increases from Chicago base would have been somewhat higher than from Eastern points. For instance, the rates as filed proposed to increase the charge from Chicago to Cedar Rapids, Iowa, from 24c. to 30c. and from Pittsburgh to the same point from 45c. to 47c. Other comparisons are: Chicago to Bowling Green, Mo., from 23c. to 30c.; Pittsburgh to Bowling Green from 46c. to 47c.; Chicago to Stevens Point, Wis., from 23c. to 30c., and between Pittsburgh and Stevens Point the rate would have been raised from 46c. to 49c.

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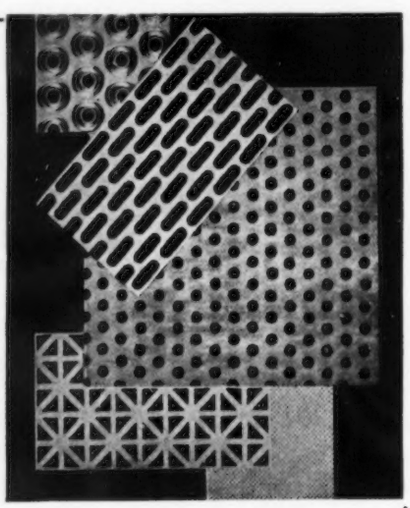

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German Firm Buys Steckel Hot Mill

THE Hoesch Köln-neussen A. G., Dortmund, Germany, steel manufacturer, has concluded a license arrangement with the Cold Metal Process Co., Youngstown, and will immediately install a hot strip mill of the Steckel type for the production of flat rolled products. This mill will have an annual capacity of 300,000 tons of hot-rolled strip.

This mill will be of the single stand reversing type, developed by the Cold Metal Process Co., with coiling reels operating within heating furnaces located on either side of the mill stand. The coil of hot strip passes from one coiling reel through the mill and is wound upon the coiling reel within the furnace on the opposite side of the mill stand. The mill is then reversed and the strip is rolled in the opposite direction, this procedure continuing until the desired thickness is reached. The mill will use hot break downs in the form of heavy plate in a manner similar to that employed in operating the Steckel hot strip mill at the Indiana Harbor, Indiana, plant of the Youngstown Sheet & Tube Co. The strip produced on this mill will be in large coils in widths up to 50 in., the mill being capable of rolling to light gages.

The equipment will be supplied by Fried. Krupp Grusonwerk Aktiengesellschaft of Magdeburg-Buckau, Germany. This will be the fourth installation of a Steckel hot mill, as at the present time there are three similar mills in regular operation, two in the United States and one in Canada.

Four additional large power transformers have been purchased from the Westinghouse Electric & Mfg. Co. for the Boulder Dam power project. They will supply power to the Metropolitan Water District of Southern California and are rated 55,000 kva. each, single phase, 60 cycles, water cooled for stepping up from 16,500 volts to 230,000 volts.

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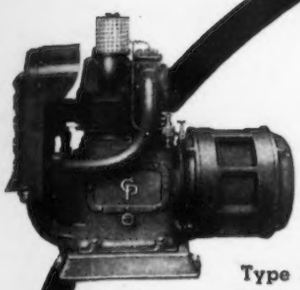
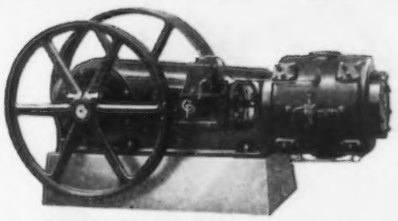
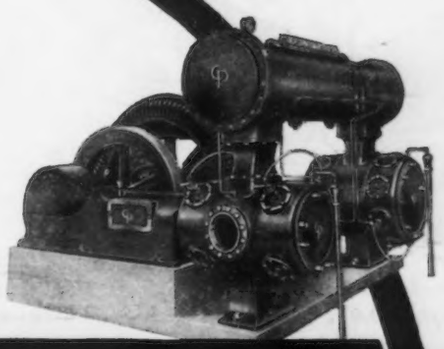


Type PM Two-Stage
Air-Cooled Compressor
With Built-in Motor



Type T Horizontal Single-Stage
Belt-Driven Compressor



Type O Two-Stage
Direct-Connected Electric
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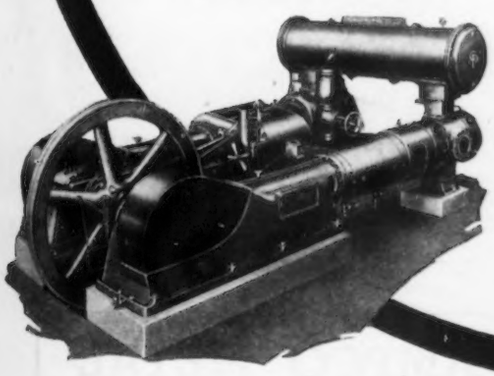
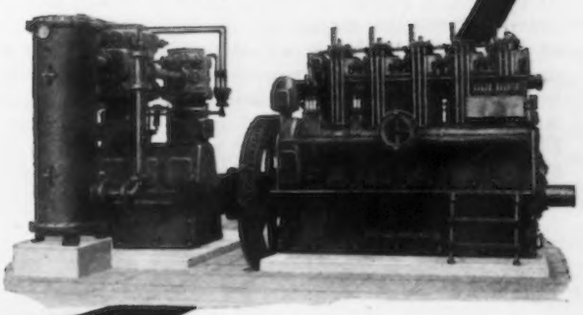
Type O Compound Steam-Driven
Two-Stage Compressor



Type V Vertical Two-Stage
Compressor Direct-Connected
to CP Diesel Engine



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Fuller-Warren Plant Sold at Auction

PROPERTY of the Fuller-Warren Co., Milwaukee, pioneer manufacturer of domestic stoves and ranges, in receivership since 1934, was sold for slightly in excess of $125,000 at public auction on Aug. 31 by Paul J. Porter, receiver. The Marine National Exchange Bank of Milwaukee, holder of a $100,000 mortgage on the property, on which interest of $9,000 had accumulated, was the highest bidder, offering $75,000 for the main building and $25,000 each for two adjoining units, including the major part of the machinery, as well as the nine-acre plant site. Small parcels of equipment and office fixtures were purchased by other bidders.

The property was appraised at $350,589 for the purposes of the auction, although a number of years ago it was carried on the company's books at approximately $1,500,000. In addition to the mortgage, there is due $40,000 in taxes and about $100,000 in other indebtness. The purchaser plans to rent or sell the plant, either in whole or in part. Two foundries of the property were leased several months ago to the General Foundries Co. by the receiver. The main building embraces a large enameling shop, sheet metal department, machine shop, and assembly room. It was stated that the receiver in recent months received a number of inquiries relative to the acquisition of the building to establish a jobbing enameling plant.

British Wire Mill Buys American Equipment

VAUGHN MACHINERY CO., Cuyahoga Falls, Ohio, has been awarded a large order covering complete wire mill equipment for the new Cardiff, South Wales, plant of Guest, Keen & Nettlefolds, Ltd., Birmingham, England, one of the largest manufacturers of steel and allied products in Great Britain. The plant will be ready on or about Jan. 1, 1937, and will have an annual capacity of 50,000 tons of wire in sizes down to No. 20.

Vaughn Machinery's order is part of an extensive new building and modernization program on the part of Guest, Keen & Nettlefolds, it is reported. Transfer has been made of the English company's wire drawing plant and nail works from Newport and Rogerstone to Cardiff, where steel making activities are to be concentrated, with new coke ovens, blast furnaces, steel melting and rolling plants having a weekly capacity of 6000 tons coke, 9000 tons pig-iron, 7500 tons ingot and 6500 tons of finished rolled steel.

Davison Coke & Iron Co., Pittsburgh, has changed its name to the Pittsburgh Coke & Iron Co. No other changes in the corporate set-up will be made. The Green Bag Cement Co., a subsidiary of the Pittsburgh Coke & Iron Co., will continue to operate as formerly.

SHOOT YOUR TROUBLES with AMPCO METAL

That bushing that won't "stay put" will quit bothering you just as soon as it's replaced with Ampco Metal. Those gears that break under that unavoidable overload and those worm wheels that chew to pieces in a period of weeks won't hold up production any more if they are made of Ampco Metal.

In the words of an engineer who for twelve years has used Ampco in many locations, "We install Ampco and forget our troubles."

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MILWAUKEE, WISCONSIN

No Scrap Shortage, Says M. V. Bonomo

IN a talk before the mid-year conference of the Institute of Scrap Iron and Steel in the Hotel Statler, Detroit, Wednesday evening, Sept. 9, Michael V. Bonomo, of Schiavone-Bonomo Corp., scrap broker and dealer, discussed the effect of recent heavy exports of scrap on the domestic situation. Mr. Bonomo declared that there is no such thing as a shortage of scrap in this country.

"We have the greatest production and reservoir of scrap in the world," he said, "so much so that only lately certain outlying districts have been tapped for the first time since the World War. Much of this surplus material can be exported without any detriment to our domestic steel industry."

"What effect has the export of scrap had on the steel mills now that they are busy and in need of scrap?" was asked by Mr. Bonomo and he answered this question as follows:

"Frankly, I believe it has brought some of them a temporary shortage of scrap that could have been avoided had they been farsighted enough in securing their requirements, instead of staying out of the market and trying to depress prices. But in the last two months they have come out into the open and told the scrap dealer that they need scrap. They have met the market prices and bought large tonnages. They have met the natural rise in prices, caused by the inflexible law of supply and demand.

"I believe that while the position of some mills is not as comfortable as they would like to have it, it has eased much and I predict that soon a steady supply of scrap will flow into the mills the same as heretofore and prices will find their level according to the same law of supply and demand.

"In the last year and particularly in the last two months, conditions have permitted the scrap man to return to his primary and paramount function, which is to supply the domestic steel industry with an uninterrupted flow of scrap in accordance with its requirements.

"Now let us see what a strong domestic market has done to the export of iron and steel scrap. It has put it to sleep; with the possible exception of the South and Gulf territory, from which localities scrap has always been exported, there is very little of this commodity being sold for export. There is still some movement of export in all the Atlantic, Gulf and Pacific ports, which is continually tapering off as old orders are being filled."

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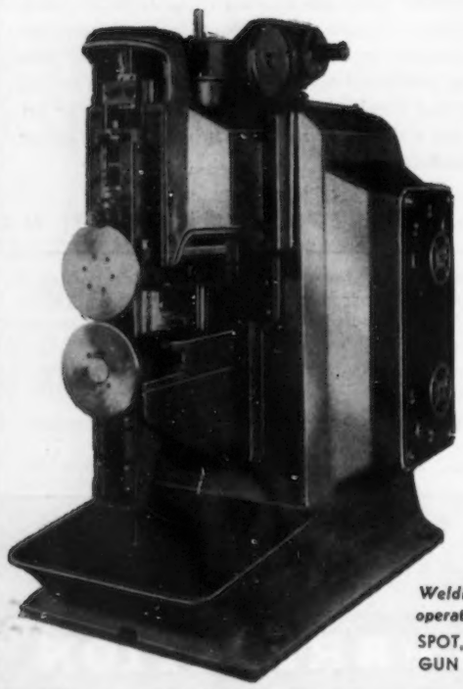
Steel Ingot Output in August Highest Since March, 1930

OUTPUT of open-hearth and Bessemer ingots in August, totaling 4,195,130 gross tons, exceeded the previous high mark of this year—4,046,253 tons in May—and also topped all other months since March, 1930, when the total was 4,254,331 tons.

The August volume represented a gain of 272,399 tons over July production and of 1,279,200 tons over August, 1935. The daily rate for the 26 working days of the month was 161,351 tons, against 150,874 tons the month before and only 107,997 tons for August last year. Operations averaged 73.52 per cent of the industry's capacity, which compares with 68.74 per cent in July and 48.78 per cent in August, 1935.

The total amount of steel ingots produced from January through August this year was 29,444,196 gross tons, contrasting with 21,226,408 tons in the comparable period last year, an increase of nearly 39 per cent.



SWIFT SEAM WELDER

with direct motor driven free running rolls operating on self-contained preloaded cartridge type roller bearings.

Swift Electric Welder Co.
6560 EPWORTH BLVD.
DETROIT, MICH.

Welding machines which are hand, hydraulic or air operated including the following types:
SPOT, SEAM, PROJECTION FLASH, FLUE AND GUN WELDING UNITS.

Carnegie-Illinois to Meet Workers Sept. 14

PITTSBURGH, Sept. 8.—Management of the Carnegie-Illinois Steel Corp. will meet with employee representatives on Monday, Sept. 14, to discuss wages, group insurance and pensions. The employees' delegation, consisting of three men from each of the company's sheet and tin plate plants, will mark a departure from the procedure that has heretofore been in effect in relations between the steel company and the so-called company unions. Up to this time the management of each plant has dealt separately with its own employee group through selected employee representatives, but the workers, of their own volition, have effected a combination of the various committees and are presenting a united front. The enlarged committee will represent about 23,000 of the company's employees, and, while this committee has no official standing under the established procedure, Carnegie-Illinois acceded to its request for an audience.

The outcome cannot, of course, be predicted with any degree of certainty, but there is still a strong belief in quarters outside of the employees' group that the matter of a wage increase has not been definitely disposed of. It is common knowledge that many of the steel companies would prefer to postpone final action until later in the year.

Beehive Coke Output

PRELIMINARY estimates made by the Bureau of Mines show that during August 124,100 net tons of beehive coke was produced in this country, compared with 110,700 tons last month and 56,100 tons in August, 1935.

August Pig Iron Output

2,711,721 Tons

ON the basis of complete returns from companies producing pig iron, actual production of coke pig iron in August was 2,711,721 gross tons, or only 290 tons more than the estimated total given in last weeks's issue. The number of furnaces in blast on Sept. 1, as revised, was 148 compared with 146 active on Aug. 1. In addition to the number of furnaces reported as having been put in blast last week, U. S. Steel blew in a Duquesne unit. The 148 furnaces operating on Sept. 1 were making iron at the rate of 88,075 tons daily, compared with 146 on Aug. 1, operating at the rate of 83,720 tons daily.

Daily Average Production of Coke Pig Iron

Gross Tons

	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	83,686	49,041	39,510	57,821	18,461
August	87,475	56,816	34,012	59,142	17,115
September	.....	59,216	29,935	50,742	19,753
October	.....	63,820	30,679	43,754	20,800
November	.....	68,864	31,898	36,174	21,042
December	.....	67,950	33,149	38,131	17,615
Year	.....	67,556	43,592	26,199	23,733

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1936	1935	1936	1935
January	2,025,885	1,477,336	24,766	10,048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	2,594,268	1,520,263	20,205	13,175
August	2,711,721	1,761,286	20,658	12,735
September	.....	1,776,476	.....	15,983
October	.....	1,978,411	.....	19,007
November	.....	2,065,913	.....	18,245
December	.....	2,106,453	.....	17,126
Year	.....	21,007,802	.....	185,173

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256
February	11,296	6,288	7,071	2,863	7,251
March	10,831	7,089	7,197	2,412	1,157
April	13,897	8,799	8,838	1,908	5,287
May	12,814	8,441	9,099	3,129	4,658
June	14,209	7,874	9,499	4,088	6,090
July	11,619	8,644	7,880	6,783	3,329
August	12,148	8,194	6,043	7,756	3,070
September	.....	10,090	4,986	10,034	3,213
October	.....	11,199	5,765	8,634	4,286
November	.....	12,503	6,610	7,639	4,435
December	.....	13,312	4,399	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) August (31 Days)	Production (Gross Tons) July (31 Days)	September 1 Number in Blast	September 1 Operating Rate, Tons a Day	August 1 Number in Blast	August 1 Operating Rate, Tons a Day
New York:						
Buffalo	179,724	180,265	10	5,800	10	5,820
Other New York and Mass.	32,934	31,865	2	915	3	1,030
Pennsylvania:						
Lehigh Valley	57,517	55,146	5	1,855	5	1,940
Schuylkill Valley	26,767	23,229	2	865	2	750
Susquehanna and Lebanon Valleys	14,692	12,085	1	475	1	390
Ferromanganese	.....	.....	0	.....	0	.....
Pittsburgh District	636,513	585,447	31	20,700	29	18,885
Ferro. and Spiegel	12,668	11,706	3	410	3	470
Shenango Valley	52,462	49,491	3	1,690	3	1,595
Western Pennsylvania	81,932	81,718	4	2,645	4	2,635
Ferro. and Spiegel	5,578	5,967	1	180	1	190
Maryland	100,199	83,247	4	3,230	3	2,190
Wheeling District	149,435	137,944	7	4,820	7	4,450
Ohio:						
Mahoning Valley	272,179	266,002	13	8,780	13	8,580
Central and Northern	251,247	238,513	14	8,165	13	7,695
Southern	26,827	12,896	3	865	3	690
Illinois and Indiana	521,858	540,337	24	17,345	25	17,430
Michigan and Minnesota	81,654	80,963	5	2,635	5	2,610
Colorado, Missouri and Utah	29,717	25,196	2	960	2	815
The South:						
Virginia	.....	.....	0	.....	0	.....
Ferro. and Spiegel	2,412	2,532	1	80	1	80
Kentucky	25,830	25,888	2	835	2	835
Alabama	148,083	142,112	10	4,775	10	4,585
Ferromanganese	.....	.....	0	.....	0	.....
Tennessee	1,493	1,719	1	50	1	55
Total	2,711,721	2,594,268	148	88,075	146	83,720

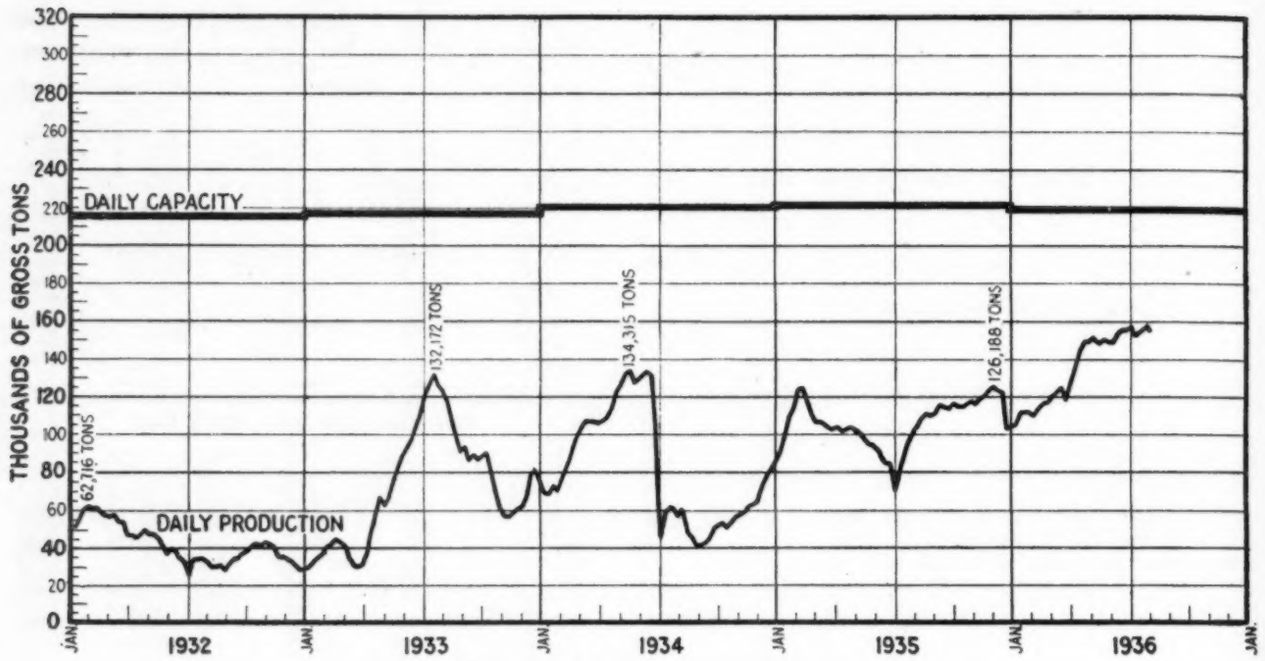
Republic to Rebuild Blast Furnace

REPUBLIC STEEL CORPORATION has placed a contract with Arthur G. McKee & Co., Cleveland, for rebuilding the No. 4 blast furnace of its Corrigan-McKinney plant in Cleveland. The capacity of the furnace will be increased from 600 to 1000 tons per day. With the rebuilding of this stack, the four blast furnaces at the Corrigan-McKinney plant will have a daily capacity of 2800 tons. The present furnace was built in 1915-16. The furnace hearth will be enlarged from 17½ ft. to 26 ft., stoves will be improved and other changes will be made to bring the furnace up to date. The rebuilding of this furnace will involve an expenditure of over $1,000,000.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ended Sept. 14, 1935	Sept. 15, 1934	Sept. 16, 1933	Sept. 17, 1932
153,631	158,020	116,225	42,937	86,670	33,521



Latest values plotted on the above chart are for the past week in each case.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Aug. 15, 1936	Sept. 14, 1935	Sept. 15, 1934
Pittsburgh	68.0	69.0	65.0	45.0	11.0
Chicago	73.0	73.0	73.0	60.0	24.0
Valleys	65.0	76.0	79.0	60.0	23.0
Philadelphia	55.0	55.0	55.0	39.0	16.0
Cleveland	72.0	78.0	78.0	54.0	15.0
Buffalo	80.0	74.0	77.5	38.0	19.0
Wheeling	94.0	96.0	95.0	80.0	21.0
Southern	60.5	60.5	60.5	46.0	25.0
Ohio River	89.0	89.0	81.0	70.0	20.0
Western	70.0	70.0	66.0	35.0	10.0
St. Louis	71.0	71.0	70.0	32.0	25.0
Detroit	100.0	100.0	100.0	95.0	76.0
Eastern	90.0	90.0	90.0	35.0	20.0
Aggregate	70.0	72.0	71.0	52.5	19.5
Average Year to Date	63.9	63.7	62.9	46.1	41.0

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended Sept. 9, 1936	Sept. 1, 1936	Aug. 11, 1936	Sept. 10, 1935	Year to Date 1936	1935
Fabricated structural steel awards	20,900	11,265	30,215	25,650	780,255	533,510
Fabricated plate awards	680	210	555	1,210	164,935	102,130
Steel sheet piling awards	555	695	2,705	7,500	40,340	46,835
Reinforcing bar awards	2,870	3,315	17,660	3,510	*257,195	225,050
Total Lettings of Construction Steel	25,005	15,485	51,135	37,870	1,242,725	907,525

. . . . SUMMARY OF THE WEEK. . . .

. . . Advances on semi-finished steel, bars and hot-rolled annealed sheets.

o o o

. . . Cold-finished carbon bars and rail steel $2 higher.

o o o

. . . Weakness in some wire products recognized by lower quotations.

CLARIFICATION of the steel price structure for the fourth quarter is developing as a result of the announcement by Carnegie-Illinois Steel Corp. of a $2 a ton advance on semi-finished steel, with the exception of skelp, and on hot-rolled merchant bars and the lighter gages of hot-rolled annealed sheets. Other steel companies have been slow to take definite action, but it appears certain that the advances will become general before the end of the week.

In line with the increase on hot-rolled bars, a producer of cold-finished bars has announced a $2 a ton rise for fourth quarter on the carbon grade. Makers of rail steel bars have also made a $2 a ton advance except on reinforcing material. Electrical sheets, on which a price increase of $2 a ton was announced by one manufacturer several weeks ago, will be quoted at the higher level by other producers.

No other price changes on steel products are in prospect for the coming quarter except for wire rods, barbed wire and nails, on which lower quotations are now in effect for immediate acceptance, subject to a possible readjustment for fourth quarter. In recognition of recent sharp price competition on wire nails, a large producer is taking business for nearby shipment at $1.90 per keg, Pittsburgh, a decline of $4 a ton from published prices, but $2 a ton above prices realized on recent sales along the Atlantic seaboard. Barbed wire prices have been reduced a like amount. Although the wire rod price for the base sizes, Nos. 4 and 5, has not been changed, larger sizes, used mostly by the bolt and nut industry, are being sold at a reduction of $2 a ton.

Except for the weakness in some wire products, the general price structure presents a firm situation. In announcing changes the Carnegie-Illinois Steel Corp. stated frankly that increases on some products were necessitated by higher levels for scrap and other materials. The inference is that these changes have no bearing on demands of workers for a pay increase of at least 10 per cent, which, if granted, would lift the United States Steel Corp.'s annual payroll $25,000,000. The management of the corporation's principal subsidiary, Carnegie-Illinois, will meet employee representatives from nine of its plants on Monday, Sept. 14, to discuss wages, group insurance and pensions.

STEEL ingot output this week has declined two points to 70 per cent of the country's capacity, reflecting shutdowns for Labor Day. A further upward trend during the remainder of this month is clearly indicated even with a minimum of support from the automobile industry, which was at low ebb last week with only the Ford Motor Co. remaining in production on 1936 models. Renewed demand from the motor car manufacturers on a large scale is expected by the end of the month. Price changes will drive in considerable business.

Meanwhile, railroad buying is on an ascending scale, structural steel fabricators are taking large tonnages for work in progress and the demands of miscellaneous users are showing no signs of letdown, but, on the contrary, in many instances are increasing. Railroad orders included 10,000 tons of rails and a like amount of track supplies for the Seaboard Air Line, 10,000 tons of rails and 9000 tons of track supplies for the Chicago Great Western, and in immediate prospect is 90,000 tons of rails for the Santa Fe. The Boston & Maine and the Maine Central railroads have each ordered 750 steel freight cars, and sizable purchases by other roads are expected soon. Railroad car repair work is very heavy because of the Interstate Commerce Commission ruling which permits them to charge such expenditures to maintenance.

RAW material markets are active and strong. A sharp rise has occurred in pig iron bookings. Although current prices have been continued into the fourth quarter, there is a possibility that higher quotations may be announced before the end of that period if coke scarcity should become more serious and scrap should go higher. With a 50c. advance at Chicago and one of 25c. at Pittsburgh, THE IRON AGE composite price for heavy melting steel has risen to $16.25, which is only $1.33 a ton below the 1929 peak. Pig iron and finished steel composite prices are unchanged; the finished steel advances will not be reflected until Oct. 1.

. . . PITTSBURGH . . .

. . . Price changes are announced for the fourth quarter.

o o o

. . . Semi-finished, bars and hot-rolled annealed sheets higher.

o o o

. . . Cold-finished carbon bars also to go up; wire rods, nails lower.

PITTSBURGH, Sept. 9.—Attention is centered this week on the fourth quarter price announcement of a leading producer. Semi-finished steel, except skelp, hot-rolled bars and certain sheet items will be advanced $2 a ton.

Reductions have been made on pickling and oiling extras, while some increases will be established on certain gage extras on heavy sheets. Plates and shapes have been reaffirmed for the next quarter.

A producer of cold-finished material has announced a $2 increase on cold-finished carbon bars for fourth quarter delivery. Present prices on seamless boiler tubing and mechanical tubing have been reaffirmed and it is not expected that there will be any change for other tubular products. Wire prices have not been announced, but within the past week one producer has been quoting to all the trade going prices on certain merchant wire items which reflect the weakness prevalent over the past month.

Steel ingot output in the district is down fractionally to 68 per cent of capacity. Most of the decline is accounted for by a shutdown at one of the independent plants for an employees' picnic. Higher operations are expected next week. Wheeling district production is down two points to 94 per cent of capacity.

General all around demand has continued its upward course over the past week. A sharp increase in hot-rolled bar, cold-finished bar, and sheet bookings is expected some time this month when automobile manufacturers increase their tonnages. Consumers will also attempt to anticipate their needs on those items which will be increased; however, they may not have much success since backlogs at the mills remain heavy. Movement of heavy materials continues at a satisfactory rate.

The Bethlehem Steel Corp. will build 750 gondola cars for the Boston & Maine Railroad at Johnstown, Pa.

American Bridge Co. has been awarded a contract involving 6500 tons of material for the General Motors assembly plant at Linden, N. J.

The raw materials market has shown further signs of strength. Movement of pig iron has increased over the past week and a Struthers, Ohio, furnace has completed negotiations for a six months' supply of beehive coke. It will use about 15,000 tons a month. A firmer tone is evidenced in the scrap market with heavy melting up 25c. a ton.

Pig Iron

Third quarter prices on pig iron have been extended for fourth quarter delivery. Demand continues to improve. The Pittsburgh Coke & Iron Co. has blown in its Sharpsville merchant furnace, which has been idle for some time. A substantial tonnage of pig iron has been contracted for by an independent steel company in this district. The amount, which is more than the normal requirements, is due to increased use of pig iron on account of scrap prices and to the putting in of additional open hearth furnaces purchased by the company some time ago. These open hearth furnaces have been idle since purchased. Acquisition of a non-integrated strip mill has increased requirements for raw steel. It is expected that the Struthers Furnace Co. will blow in its merchant furnace at Struthers, Ohio, about Oct. 15.

Semi-Finished Steel

Fourth quarter quotations on rerolling and forging billets and sheet bars have been announced by a leading producer, and reflect an increase of $2 a ton over present prices. As yet no announcement has been made on wire rods. Meanwhile, demand for semi-finished material has shown a good improvement over the past week and, since higher prices are now certain next quarter, considerable tonnage is expected to be placed during the remainder of this month.

Bolts, Nuts and Rivets

Producers have reaffirmed third quarter prices for fourth quarter delivery. Specifications over the past week have shown further improvement and there is evidence that total business placed will continue to increase over the remainder of the year. Miscellaneous sources are specifying more freely and placing of orders for new railroad cars is expected to stimulate this market considerably. Meanwhile, with the possibility of car shortages later in the year, railroad shops are speeding up repair programs.

Bars

Hot-rolled carbon bars and small shapes will be advanced $2 a ton for fourth quarter deliveries, making the price 2.05c. per lb. f.o.b. Pittsburgh. Aggregate bookings during the month of August were lower than those received in July. The improvement in new business noted a few weeks ago continues, and last week bookings were slightly above those of the week before. Automobile tonnage is not being received in any large volume but is expected soon. Some miscellaneous sources which had eased off seasonally are beginning to show more activity. Deliveries are slightly easier.

Cold-Finished Bars

No change in the volume of new business has been noted the past week. Automobile tonnages are still conspicuous by their absence and those consumers who stocked

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Sept. 9, 1936	Sept. 1, 1936	Aug. 11, 1936	Sept. 10, 1935
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	30.00	30.00	30.00	27.00
Sheet bars, Pittsburgh	30.00	30.00	30.00	28.00
Slabs, Pittsburgh	30.00	30.00	30.00	27.00
Forging billets, Pittsburgh	37.00	37.00	37.00	35.00
Wire rods, Nos. 4 and 5, Pgh.	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.80
Bars, Chicago	2.00	2.00	2.00	1.85
Bars, Cleveland	2.00	2.00	2.00	1.85
Bars, New York	2.30	2.30	2.30	2.15
Plates, Pittsburgh	1.90	1.90	1.90	1.80
Plates, Chicago	1.95	1.95	1.95	1.85
Plates, New York	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.80
Structural shapes, Chicago	1.95	1.95	1.95	1.85
Structural shapes, New York	2.16¼	2.16¼	2.16¼	2.06¼
Cold-finished bars, Pittsburgh	2.25	2.25	2.25	1.95
Hot-rolled strips, Pittsburgh	1.95	1.95	1.95	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.50	2.50	2.50	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.60	2.60	2.60	2.50
Sheets, galv., No. 24, P'gh	3.20	3.20	3.20	3.10
Sheets, galv., No. 24, Gary	3.30	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh	1.95	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary	2.05	2.05	2.05	1.95
Cold-rolled sheets, No. 20 Pittsburgh	3.05	3.05	3.05	2.95
Cold-rolled sheets, No. 20 Gary	3.15	3.15	3.15	3.05
Wire nails, Pittsburgh	*1.90*	2.10	2.10	2.40
Wire nails, Chicago dist. mill	*1.95*	2.15	2.15	2.45
Plain wire, Pittsburgh	2.40	2.40	2.40	2.30
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.35
Barbed wire, galv., Pittsburgh	*2.40*	2.60	2.60	2.80
Barbed wire, galv., Chicago dist. mill	*2.45*	2.65	2.65	2.85
Tin plate, 100 lb. box, P'gh.	5.25	5.25	5.25	5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Sept. 9, 1936	Sept. 1, 1936	Aug. 11, 1936	Sept. 10, 1935
No. 2 fdy., Philadelphia	$21.3132	$21.3132	$21.3132	$20.3132
No. 2, Valley furnace	19.50	19.50	19.50	18.50
No. 2, Southern Cin'ti	20.2007	20.2007	20.2007	19.2007
No. 2, Birmingham†	15.88	15.88	15.88	14.50
No. 2, foundry, Chicago*	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	19.8132
Basic, Valley furnace	19.00	19.00	19.00	18.00
Malleable, Chicago*	19.50	19.50	19.50	18.50
Malleable, Valley	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago	25.2528	25.2528	25.2528	24.2528
Ferromanganese, seab'd carlots	75.00	75.00	75.00	85.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	**$17.50**	$17.25	$15.75	$13.25
Heavy melting steel, Phila.	15.00	15.00	14.00	12.50
Heavy melting steel, Ch'go.	**16.25**	15.75	15.00	12.50
Carwheels, Chicago	**16.00**	15.50	15.00	12.75
Carwheels, Philadelphia	16.25	16.25	15.25	11.75
No. 1 cast, Pittsburgh	15.75	15.75	14.75	14.25
No. 1 cast, Philadelphia	**16.75**	15.75	15.25	11.75
No. 1 cast, Ch'go, (net ton)	13.50	13.50	13.50	11.25
No. 1 RR. wrot., Phila.	14.75	14.75	14.75	12.25
No. 1 RR. wrot., Ch'go (net)	**14.25**	13.75	13.75	9.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.65	$3.65	$3.65	$3.25
Foundry coke, prompt	4.00	4.00	4.00	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	9.75	9.75	9.75	8.25
Lake copper, New York	9.87½	9.87½	9.87½	8.62½
Tin (Straits), New York	**45.20**	43.12½	43.25	48.25
Zinc, East St. Louis	4.85	4.85	4.80	4.60
Zinc, New York	5.22½	5.22½	5.17½	4.97½
Lead, St. Louis	4.45	4.45	4.45	4.20
Lead, New York	4.60	4.60	4.60	4.35
Antimony (Asiatic), N. Y.	12.50	12.50	12.50	13.00

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Sept. 9, 1936	2.159c. a Lb.	$18.73 a Gross Ton	$16.25 a Gross Ton
One week ago	2.159c.	18.73	16.00
One month ago	2.159c.	18.73	14.92
One year ago	2.124c.	17.84	12.75
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1936	2.159c., July 7	2.084c., Mar. 10	$18.84, Jan. 7	$18.73, Aug. 11	$16.25, Sept. 9	$12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

up liberally during June and July are not placing any large orders at this time. A much better volume of specifications is expected before the end of this month when automotive manufacturers will be taking considerably more steel for 1937 model production. There are further indications that seasonal leveling off in some miscellaneous lines has come to an end. Reflecting the advance in hot-rolled bars, one producer has raised quotation for cold-finished bars $2 a ton for fourth quarter delivery.

Shapes and Plates

Third quarter prices on heavy plates and shapes have been reaffirmed for fourth quarter delivery. Miscellaneous demand continues to show improvement and plate mills remain six to eight weeks behind on delivery. Bethlehem Steel Co. at Johnstown, Pa., will build 750 gondola cars, 50-ton size, for the Boston & Maine Railroad.

Steel Sheet Piling

A few jobs involving 150 to 250 tons have been awarded in the past week. Inquiries are out for the Conchas dam at New Kirk, N. M., involving 874 tons. Bids will be taken on Sept. 18 for dam No. 4 on the Allegheny River at Braeburn, Pa., requiring 477 tons. No announcement on fourth quarter prices has been forthcoming, although it is expected that present quotations will be reaffirmed.

Tin Plate

Aggregate specifications have leveled off slightly over the past week. Especially has this been true as far as packers' specifications are concerned, owing to seasonal influences. Orders for general line can material are near the level of a week ago. Producers continue to have backlogs running from four to eight weeks on cold-rolled tin plate. Operations are down five points this week to 85 per cent on account of the holiday.

Tubular Products

Within the past week or 10 days bookings for oil country goods have eased off slightly. This condition was attributable to lack of water in the oil fields which resulted in some curtailment in drilling operations. The situation is temporary and already there is evidence that the steady flow of orders will be resumed. Producers have opened their books for the fourth quarter on seamless boiler tubes and mechanical tubing with no change from present quotations. It is the opinion that there will be no increase in fourth quarter prices on other seamless tubing and standard pipe.

Wire Products

No announcement has been made regarding fourth quarter prices. Within the past week going prices on certain merchant wire items have been recognized. An attempt has been made to quote a single price to everybody, with a jobber discount for those recognized jobbers who certify that their sales were made to dealers for the resale market. As a result of this move, the following are prices for carload lots, f.o.b. Pittsburgh, on orders taken before the end of this month: standard wire nails $1.90 per keg; polished staples $2.60 per 100 lb.; galvanized staples $2.85 per 100 lb.; barbed wire galvanized, $2.40 per 100 lb.; woven wire fence, column 57. Some confusion exists at the present time; however, this will be cleared up when fourth quarter prices are announced. It appears that the stage is being set, so far as one large producer is concerned, for a much firmer situation regarding prices than has existed for some time.

Strip Steel

Announcement by a leading producer has been made, reaffirming present prices for fourth quarter delivery on hot-rolled strip. It is expected that cold-rolled strip will also be reaffirmed. Slight improvement over the past week in aggregate demand has been noted. Material is moving forward to automobile manufacturers, but large volume bookings have not been placed as yet. Miscellaneous users have shown a little more activity over the past week and mill backlogs remain unchanged.

Sheets

A leading producer has announced fourth quarter prices. Hot-rolled annealed sheets, 24 gage base, are up $2 a ton. Hot-rolled sheets, 10 gage base, are unchanged, but the gage extras on heavy sheets will be up $1 a ton on 12, 13, 14 and 15 gage, and up $2 a ton on 16 gage. Extras charged for pickling and oiling sheets have been combined, effecting reductions as follows: 12 gage and heavier, 15c. instead of 25c.; 13 to 16 gage inclusive, 20c. instead of 30c.; 17 gage to 21 inclusive, 35c. to 40c.; 22 gage and lighter, unchanged at 45c. As previously reported, electrical sheets are up $2 a ton for fourth quarter. There will be no change in the prices of cold-rolled, galvanized, and long ternes. Meanwhile, specifications within the past week recorded a sharp improvement. The gain came both from automotive sources and miscellaneous buyers.

Coal and Coke

A contract involving 15,000 tons of beehive coke a month for the next six months has been completed, representing the requirements for the Struthers Furnace Co. merchant blast furnace which will be blown in at Struthers, Ohio, about Oct. 15. This is the third large beehive coke contract to be consummated within the past few months. Meanwhile, by-product coke is moving at virtual capacity. Shipments of domestic size beehive coke continue to increase. Domestic coal is moving at a much better rate and prices have already advanced 50c. a ton to the consumer and other advances are in prospect some time this month.

. . . Pig iron sales gain materially.

o o o

. . . Foundry melt shows an increase.

BOSTON, Sept. 8.—Pig iron buying has increased materially, sales the past week aggregating about 7000 tons, the largest noted for any similar period in a long time. Sales ranged from small lots to 1000 tons, with the bulk for fourth quarter delivery. There were two 1000-ton lots, one 700 tons and one 600 tons. The Mystic Iron Works took 20 orders with a total of better than 4000 tons. The local furnace reports some delay in shipments owing to a car shortage. The New England weekly melt has been stepped up, largely because of increased activity in Connecticut. While actual figures are not available, New England by-product foundry coke makers report shipments running well in excess of a year ago.

Steel fabricators booked no round tonnages the past week and none of size came out for figuring. There is a considerable tonnage hanging over the market which should close shortly, and quite a little reinforcing steel bar business should be placed within a fortnight. Warehouse sales continue to show encouraging increases as compared with a year ago.

. . . . CHICAGO . . . .

. . . Ingot rate for district holds at 73 per cent of capacity.

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. . . Business still brisk, and larger railroad buying is expected.

o o o

. . . Some price advances announced; rods, barbed wire and nails lower.

CHICAGO, Sept. 9. — Ingot production stands at 73 per cent of capacity, which is close to the practical limit at which local mills can make steel as dictated by the character of demand. Inland Steel Co. is obtaining better flexibility by the lighting of a new open hearth furnace, the first of a new battery of four 200-ton units, the remainder of which will be in use about the middle of October.

Price advances are being announced on semi-finished products, soft steel bars, rail steel bars and hot rolled annealed sheets. A $1.90 temporary price per keg is being recognized on nails and one company is revising quotations downward on some sizes of rods.

Mills expect that buying for fourth quarter will be greatly stimulated by these changes. In fact, sales are already quite active, the total for the week being the fourth largest of the year. Specifications are climbing and are now at the rate of late June.

The railroad field still holds much promise. The Elgin, Joliet & Eastern is starting heavy repairs on 300 box cars and the Santa Fe is close to purchasing 90,000 tons of rails. Formal inquiries for 1000 cars by the Kansas City Southern are expected any moment. More rail buying is destined to come before prices change at the end of November.

Chicago district structural fabricators estimate that fully 90,000 tons of new work is overhanging this market, and that most of it will reach shops before winter sets in.

The scrap market continues to move higher and dealers and brokers are noticing the effects of Eastern competition in territory far to the southwest of Chicago.

Pig Iron

Fourth quarter buying is well under way, but it has not yet reached the large proportions which some sellers had anticipated. Prices are firm and there is talk among users of the possibility of higher quotations before the end of the year. Automobile foundries are busier and farm implement units are gaining slowly.

Reinforcing Bars

The south sector of the Lathrop housing project, Chicago, requiring 900 tons, has been placed and early orders are looked for on 800 tons to be used in the north sector. The reinforcing bar market is showing less snap, but shops are busy and backlogs substantial and operations will continue at near capacity for some time to come. Highway work is unusually slack considering the number of plans prepared and the political aspect of forcing the issue of employment. Sheffield, Republic, Laclede and Carnegie-Illinois entered the low bids on 3600 tons at Fort Peck, Mont.

Warehouse Business

September business has opened in satisfactory volume and all signs indicate that October will be a peak month. The business-approach level to October is the highest in seven years. Prices are steady with exception of the usual irregularities in light gage galvanized and black sheets. Country demand still leads ctiy use despite the drought, which may not show its full effects until late fall.

Sheets

For fourth quarter, Carnegie-Illinois Steel Corp. has marked up No. 24 gage hot-rolled annealed sheets $2 a ton to 2.73c. a lb., Chicago, which includes a local switching charge of 60c. a ton. Inland Steel Co. has announced that it will make a similar advance. It is expected that other mills will follow suit. On the heavy hot-rolled sheets, for which No. 10 gage is base, new extras have been applied, the extra for No. 12 gage to be 10c., No. 13 gage, 15c.; No. 14 gage, 20c.; No. 15 gage, 25c.; and No. 16 gage, 35c., all per 100 lb. The old extras were 5c. on each gage up to No. 16, which carried a 10c. extra. Sheet mills are producing at near capacity. No falling off in output is expected until near the end of the year, if then.

Bars

Effective Oct. 1, soft steel bars are being marked up 10c. per 100 lb. to 2.10c., Chicago or Gary, plus the Chicago switching district charge of 60c. a ton, bringing the price delivered consumer, Gary or Chicago, to 2.13c. on a minimum car of 60,000 lb. and for less than the minimum car the minimum freight charge of $18 is added to the mill price. Tractor plants are rebounding from the recent dip, which was exceedingly shallow, all things considered. Farm implement plants are slowly increasing steel orders and their tentative plans for next year are very optimistic. Machine tool builders are engaged at capacity.

Plates

Fourth quarter books are open at unchanged prices. The trade is looking for the Kansas City Southern inquiry for 1000 freight cars. Railroad car repair work is steady and car builders are sending heavy specifications to mills. General plate business has steadily improved throughout the late summer and, while large requirements seldom appear in the market, there is no reason to expect let-up in miscellaneous demand, which is affording excellent mill support.

Structural Material

Except for a myriad of small inquiries and lettings, this market is quiet. However, prospects are excellent, as fabricators estimate that fully 90,000 tons of structural material overhangs the local market. Inaction in the matter of large awards is not disturbing to mills, which are still having much difficulty in meeting the delivery demands of shops whose bookings assure heavy operations for months

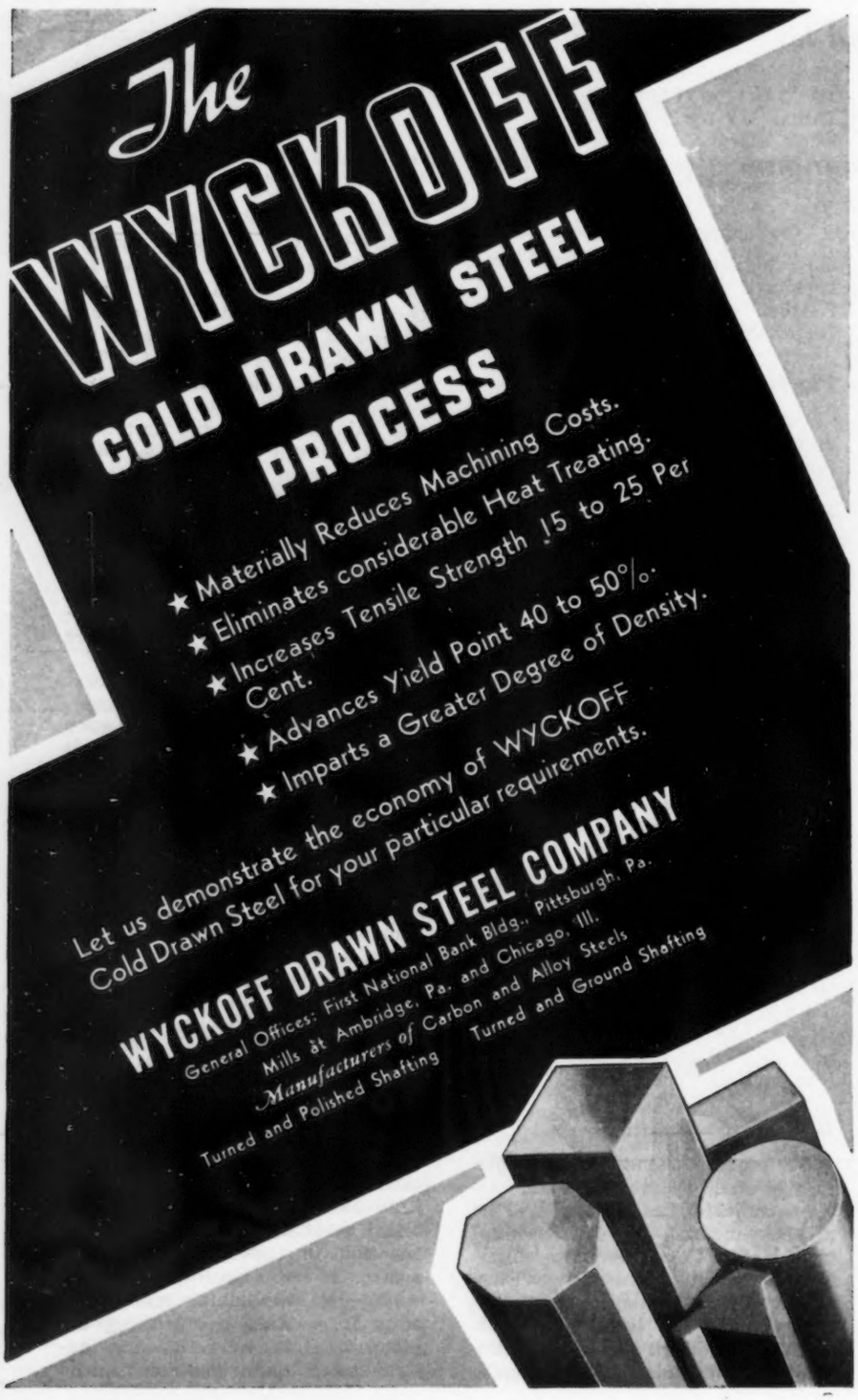
to come. The State of Illinois has come to life on two underpass projects which call for about 1000 tons.

Rails

Chicago Great Western has closed for 10,000 tons of rails, 8000 tons having been taken by Carnegie-Illinois and 2000 by Inland Steel Co. This railroad has also purchased about 9000 tons of track supplies. The recent rush of accessory business, which preceded the price advance, is affording excellent operations considering that the country's capacity is far in excess of needs. The trade is looking for Santa Fe rail orders which will approximate 90,000 tons.

Wire Products

Sellers remain silent concerning fourth quarter price policies, but buyers are on the anxious seat, believing that revisions are bound to come. Incoming tonnage is lighter, but far ahead of this time in September a year ago. This slackening can in part be attributed to the drought because nails, barbed wire and fencing are the items most vitally affected. The call for manufacturers' wire is heavy and deliveries now are not better than six to eight weeks. Soft temper and fine finished wires are in exceptional demand. Public utilities are doing better and electric cable plants are well engaged.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Turned and Ground Shafting

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has approved plans for new welded steel pipe line from Quentin, Lebanon County, Pa., to Williamsport, Pa., about 75 miles, for gasoline transmission, including branch lines to Sunbury and Williamstown, Pa., where bulk storage and distributing terminals will be located. A large bulk plant will be built also at Williamsport terminus. Cost close to $750,000.

National Tube Co., Pittsburgh, has received award from B. & M. Construction Corp., Petroleum Building, Oklahoma City, contractor, for 81,870 ft. of ¾ to 7-in. steel pipe for gas distribution system at Marfa, Tex.

Danville, Va., has let contract to Bethlehem Steel Co. for welded steel pipe line for water supply to hydraulic turbines at municipal hydroelectric generating plant on Dan River, about 60 miles from city, on which work is now under way. Fund of $2,750,000 has been arranged for project.

Dallas County Gas Co., Dallas, Tex., plans about seven miles of steel pipe lines for gas distribution system at Vickery, Tex.; also two miles of welded steel pipe for main line to municipality.

Vicksburg, Miss., plans steel pipe lines for natural gas distribution system, including main welded steel pipe line from gas field district near Jackson, Miss., to city limits, where distributing and control station will be located. Cost about $335,000. Special election has been called Sept. 22 to approve bonds for $200,000, remainder of fund to be secured through Federal aid.

Southwest Petroleum Co., Braniff Building, Oklahoma City, Okla., plans about 9500 ft. of 4-in. welded steel pipe line in city limits for crude oil transmission. C. H. Lowry, address noted, is company engineer.

St. Maries, Idaho, plans about eight miles of 12-in. steel pipe for main water line from intake dam at new water source; pipe line installation will include four river crossings. Cost about $115 000. Fund is being secured through Federal aid Arthur Tiggelbeck, Sandpoint, Idaho, is consulting engineer.

Kaw Pipe Line Co., Tulsa, Okla., has placed contract with Knupp & Son Construction Co. for a 10-mile, 6-in. Lindewelded steel pipe line near Chase, Kan.

American Brass Co. and Chase Brass & Copper Co., Waterbury, Conn., and Bridgeport Brass Co., Bridgeport, Conn., have announced wage advances of 5 per cent, effective immediately.

. . . CLEVELAND . . .

. . . Ingot output declines because of holiday shutdowns.

° ° °

. . . Nails and rods lower in price as some other quotations rise.

° ° °

. . . Business still in good volume, though some deliveries ease.

CLEVELAND, Sept. 9.—Ingot output in the Cleveland-Lorain district declined six points to 72 per cent of capacity this week. In the Valley district there was a decline of 11 points to 65 per cent of capacity. One Youngstown steel plant resumed only partial operations after a Labor Day shutdown, but will step up output again next week.

Interest has centered in fourth quarter prices. Several of the leading producers, while not yet having made official announcement, state that they will adopt for the coming quarter the prices named for that delivery by the Carnegie-Illinois Steel Corp., which has made a $2 a ton advance on billets, sheet bars and slabs, forging blooms, billets and slabs, bars and small shapes and hot rolled annealed sheets.

Prices on plates and shapes are unchanged as well as on other grades of sheets, although some mills will mark up electrical sheets $2 a ton, not having previously followed the advance made recently by one producer. Price changes include an increase in gage extras and a reduction in pickling and oiling extras on hot rolled sheets. Changes are not expected on hot and cold rolled strip. Bolt and nut and rivet prices have been reaffirmed for the coming quarter.

While higher prices are being named on some products, reductions have been made by a leading producer on nails and also on wire rods in the larger sizes that are used mostly by the bolt and nut industry. Wire rods in sizes from No. 5 to 15/32 in. and larger than 15/32 in. have been reduced $2 a ton to $38 and $40 respectively for shipment before Oct. 1. Nails are being quoted at $1.90, a 20c. per keg reduction from the published price. The Robinson-Patman law is said to be a factor in the revision of nail prices. No announcement has been made on either wire rod or nail prices for the coming quarter.

The volume of business in finished steel continues good, although not as heavy as recently. Backlogs have been reduced somewhat, making the delivery situation easier. Because of the price advance consumers are trying to place additional orders for hot rolled sheets, but mills generally can take on no more orders for this grade for September shipment.

Pig Iron

More iron has been sold for the fourth quarter than was booked during the corresponding period of June, when producers began to take contracts for the third quarter. Sales have been fairly numerous since books were opened Sept. 1 for the coming quarter, with no change in prices and many consumers are buying in somewhat larger lots than they did for the current quarter. Shipping orders this month are expected to show some gain over August. An increase in tonnage probably will come from the motor car foundries which have not been taking much iron the past few weeks. Makers of Ohio silvery iron have reaffirmed present prices for the coming quarter.

Iron Ore

Shipments of Lake Superior ore during August amounted to 7,444,444 tons, an increase of 2,663,874 tons over August last year and a gain of 289,881 tons over July. Movement by water for the season until Sept. 1 was 26,281,517 tons, a gain of 8,894,918 tons over the same period last year or 51.16 per cent. If the same percentage of gain is maintained through the remainder of the season the total movement will exceed 43,000,000 tons.

Bolts, Nuts and Rivets

Present prices on bolts and nuts and rivets have been reaffirmed for the fourth quarter by leading Cleveland manufacturers. These are 70 and 10 per cent discount for bolts and nuts, $3.05 per 100 lb. Pittsburgh and Cleveland and $3.15 Chicago and Birmingham for large rivets and 70 and 5 per cent discount for small rivets. While large rivet prices were marked up $3 a ton for the third quarter, this advance did not become generally effective until well into the quarter, as protection was given late in the last quarter at the old prices for identified jobs. Bolt and nut business declined 10 to 15 per cent in August as compared with July. However, makers expect the industry will enjoy a heavy volume of business during the coming quarter. Rivets are in good demand particularly from the railroads and considerable tonnage is being taken for tank cars for the oil industry.

Sheets

Miscellaneous demand continues brisk. Orders are still good from manufacturers of stoves, washing machines and other household equipment and galvanized sheets are in heavy demand from jobbers for replenishing stocks. New tonnage from the motor car industry is rather light. Deliveries have improved a little and there is less pressure from buyers for shipment than a few weeks ago. The announcement by a leading producer of a $2-a-ton advance on hot-rolled annealed sheets for the fourth quarter and revision in extras is being followed by other producers. Some of the mills that did not advance electrical sheets when one producer marked up this grade a few weeks ago, are announcing a $2 advance for the coming quar-

ter. Mills are so well filled up with hot-rolled sheet tonnage that some of the leading makers will be unable to take any additional orders for hot-rolled annealed material at the present price for September delivery.

Strip Steel

Both hot and cold strip are in good demand, although not much business is coming from the motor car industry. Leading manufacturers of parts for Chevrolet cars are getting under production this week on parts for new models. Specifications from these plants are fair and probably will increase.

Bars, Plates and Shapes

Bars are fairly active. Some consumers are placing sizable stock orders. Demand remains light from forge shops doing automotive work. Structural shapes and plates are moving well in small lots. Awards include 1500 tons for buildings for the International Harvester Co. in Springfield and 850 tons for extensions for Republic Steel Corp. With the price advance, steel bars will be 2.10c. Cleveland, for the fourth quarter.

. . BIRMINGHAM . .

. . . Seaboard buys 10,000 tons of rails.

o o o

. . . Also about same tonnage of track supplies.

BIRMINGHAM, Sept. 8.—Seaboard Air Line Railway announced last week that it had placed orders with the Tennessee Coal, Iron & Railroad Co. for 10,000 tons of 100-lb. rails, 750,000 tie plates, 2000 kegs of bolts, 20,000 kegs of spikes and other track materials. The rails will probably be delivered in November and December. Resumption of rolling by the Ensley rail mill, which operated for a few days during the week ended Aug. 29, is not expected before November.

Bids were opened last Friday by the city of Birmingham for the construction of an impounding dam for the city's $6,000,000 industrial water system. Walsh Construction Co., Indianapolis, was low bidder for a rock fill-earth dam, at $1,685,231. R. J. Reid, Birmingham, was low bidder for a concrete dam, with a bid of $1,826,840. Alternate bids had been asked. A decision will be reached this week as to the type of dam to be built.

The Flower Valve & Foundry Co., Chicago, has acquired the plant of the Bessemer Foundry & Machine Co., Bessemer, Ala., and has announced an extensive improvement program. The plant will make valves, hydrants and other specialties in addition to handling general foundry products.

Bids will be opened on Tuesday of next week for the construction of the superstructures of Birmingham's $2,000,000 low-rent negro housing project.

The Louisville & Nashville Railroad has recalled 250 men to its Boyles shop for repair work on freight equipment.

Pig iron producers have opened their books for the fourth quarter and reaffirmed the existing base price of $15.88. The pig iron market is quiet, but an improvement is expected before the end of the month. Shipments have been gradually increasing.

Steel demand continues at a satisfactory rate, there having been no let-up in the general buying movement of the past several months. Operations are steady, with 14 open hearths and 10 blast furnaces in production. There was no change last week and the same number will be continued this week.

Foundry and malleable pig iron, made with ore only

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J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

. . . . ST. LOUIS . . . .

. . . Pig iron demand fairly good.

o o o

. . . Agricultural implements production off.

ST. LOUIS, Sept. 7.—A fairly heavy demand for pig iron followed the opening of the books for fourth quarter. September is expected to be one of the heaviest months of the year in shipments. Business with melters has been good. There is a feeling by some that prices will be advanced during the fourth quarter.

Agricultural implement produc-

tion is falling off owing to a slackening of demand. However, operators are quite optimistic as to spring shipments, production for which will begin November 1.

Business with the jobbing foundries is holding up well. Stove foundries are beginning to increase production, and by Sept. 15 are expected to get into capacity operation.

Demand for finished steel during the week was quiet, possibly due to the holiday influence. Bids will be taken Sept. 22 for completion of the Mississippi River dam at Alton, Ill., most of the material for which already has been purchased; additional items include 150 tons of reinforcing bars.

..SAN FRANCISCO..

. . . Market dull but much work is ahead.

o o o

. . . Bids opened on two small pipe lines.

SAN FRANCISCO, Sept. 7.—Two pending pipe line projects led activity in a dull market on the Pacific Coast last week. Bids were opened in Los Angeles for a city pipe line involving 1700 tons of plates, while at St. Maries, Idaho, plans were completed for a waterworks project to involve eight miles of 12-in. steel pipe, approximating 750 tons.

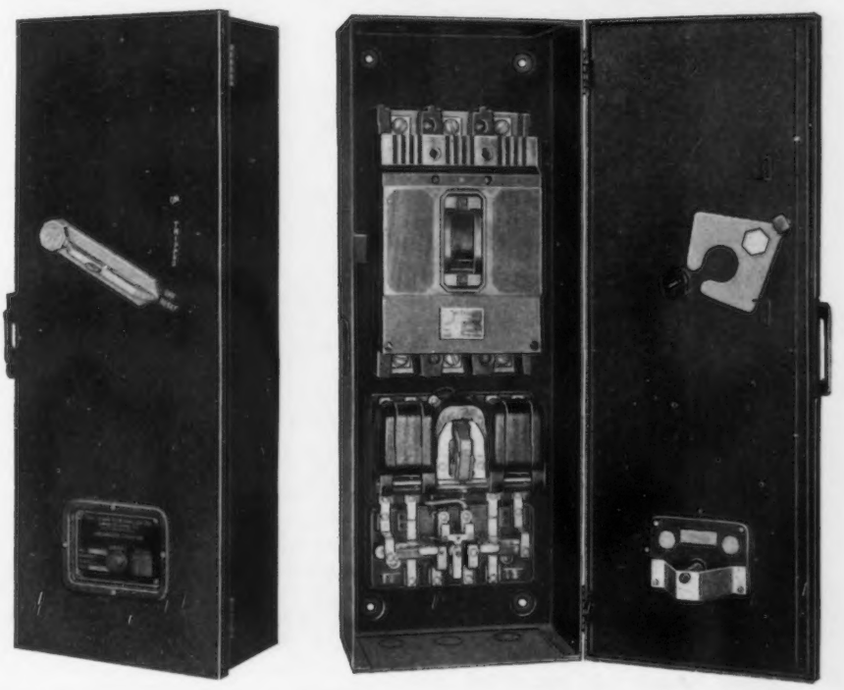
In Los Angeles, American Cast Iron Pipe Co. and U. S. Pipe & Foundry Co. were low bidders, each on half of the 4000 tons of cast iron pipe to be used in a Department of Water and Power project.

The only outstanding award was that of 1050 tons of structural steel to be utilized in the construction of butterfly sheds for the Union Railroad station in Los Angeles, to the Consolidated Steel Corp.

Awards for the week aggregated 1925 tons of structural steel, 1209 tons of reinforcing bars, and 2784 tons of fabricated plates. Greatest activity was shown in Los Angeles, both in awards and in new projects. A total there of 2100 tons of steel accounted for half of total Pacific Coast awards and in pending projects 2200 tons accounted for a good portion of new business in the far West.

As the Pacific Coast enters its fourth week of comparative inactivity, major steel companies have been able to catch up partially on the large backlog of orders established during a busy summer. Indications are that activity will be strong during the remainder of the year with several large awards to be made, notable among which are the air terminal building on Yerba Buena Shoals, involving 1070 tons of shapes; the Federal jail at San Pedro, Cal., involving 1200 tons of reinforcing steel; Federal building at Los Angeles in which 6000 tons of bars and 20,000 tons of structural steel are to be used; the Everett, Wash. pipe line, expected to involve approximately 6000 tons of plate; and Conchas Dam at Tucumcari, N. M., calling for 1150 tons of bars and 900 tons of sheet steel piling.

Clark-Sundh



Here is the latest development in a Combination Across-Line A.C. Starting Switch. An externally operated Air Circuit Breaker takes the place of the usual fused disconnect switch. The Air Circuit Breaker therefore serves the purpose of a disconnecting switch and provides short circuit overload protection. This Starter may be operated by any one of the various remote control stations such as Push Buttons, Float Switches, Pressure Regulators, etc.

The togg'e action quick-make and break feature of the circuit breaker provides high interrupting capacity.

The Breaker is operated by trip-free handle.

Thermal overload relays are also included with provision for external reset. This device is known as Clark Bulletin 6020.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
CLEVELAND, OHIO

. . . . NEW YORK. . . .

. . . Semi-finished steel, merchant and cold-finished bars and hot-rolled annealed sheets advanced.

o o o

. . . Prices $2 a ton higher named for fourth quarter by Carnegie-Illinois.

o o o

. . . No decline in new business apparent; sheet demand stronger.

NEW YORK, Sept. 8.—Outstanding in interest in the steel market this week is the announcement by Carnegie-Illinois Steel Corp. of advances of $2 a ton, effective Oct. 1, on all forms of semi-finished steel, except skelp and merchant bars, and hot-rolled annealed sheets, No. 24 gage base. These advances represent an effort to obtain prices more in line with present higher costs. With respect to semi-finished steel, it has long been contended by the integrated companies that they have large investments in steel-making departments and blooming and billet mills, which the non-integrated mills do not have, and that their prices have not yielded sufficient profit to afford a proper return on the investment. Moreover, the non-integrated mills have no expense for inventories of ore, scrap, etc. The advance on the lighter gages of hot-rolled annealed sheets represents, in part, a condition that has been brought about by the continuous mill wherein these sheets must be finished on hand mills after the breakdown on the continuous mills, thereby adding to costs as compared with cold-rolled sheets, which can be finished on the continuous mill.

The advances came as somewhat of a surprise to the trade notwithstanding all of the recent talk as to the possibility of higher prices on some products for fourth quarter. Up to this writing (Tuesday) Inland Steel Co. is the only mill which has definitely followed the lead of Carnegie-Illinois. However, as the Corporation's announcement was not made until late Friday, which was followed by a triple holiday, there was very little time up to today for competitive companies to reach a decision. It is regarded as certain, however, that other companies will put the same advances into effect.

Extras for pickling and oiling sheets have been combined with one extra applied for both processes, which in effect is a reduction of 10c. per 100 lb. on gages 12 to 21, inclusive, as compared with the combined extras heretofore charged.

The Labor Day holidays made little difference in the volume of business booked by local sales offices the past week. Aggregate tonnage held up remarkably well, and, in the case of sheets, some producers report an increase over the preceding week. All coated sheets are hard to get. Steel companies expect a further upturn in business this month, particularly in those products that will be higher in price in the next quarter. In the present sold-up condition of the mills it makes little difference in what form steel is sold because if rolling mill schedules are not filled there is a limitation on steel production brought about by shortages in scrap and coke and the obsolescence of much equipment. It is considered doubtful whether the steel industry under present conditions can attain an average rate of much, if any, over 80 per cent, though individual plants may be able to do so, and, in fact, have already done so.

Contract for 6475 tons of fabricated structural steel for the assembly plant to be built by General Motors Corp. at Linden, N. J., has been awarded to American Bridge Co. Harris Structural Steel Co. was awarded 4150 tons for hospital buildings on Welfare Island, New York.

Pig Iron

Orders for pig iron flowed in more freely last week as some of the larger consumers placed their fourth quarter requirements. The General Electric Co. contracted for 3000 tons. The usual weekly volume of small order business for prompt shipment continued. Prices have been extended, but may not remain unchanged throughout the quarter. Considerations which affect this problem are the possibility of a wage increase later on, the tightness in the coke situation and a bull market in scrap. Bearing in mind that the tonnage of pig iron sold and consumed nowadays in the metropolitan district is much less than it used to be five or six years ago, the local market now has the appearance of strength and business these last few days might almost be termed active. Manufacturers' foundries are and have been the more busy, but jobbers also are facing a better outlook and the aggregate melt in the district appears to be expanding.

Reinforcing Steel

Current activity in reinforcing bars is confined mostly to lots of less than 50 tons. The price situation is not yet clarified, shading on public works still being pronounced. Disposition of pending tonnage is proceeding very slowly, over 5000 tons remaining unsettled. All bids were rejected on one section of the Sixth Avenue subway on which J. F. Cogan Co. was reported low several weeks ago, and the job will be readvertised Oct. 2; 350 tons of bars are required for this section. Another section of this project involving 340 tons will be up for bids Sept. 11. The outlook for new business is fair.

RAILROAD BUYING

Boston & Maine has ordered 750 50-ton gondola cars from Bethlehem Steel Co.

Maine Central has placed 500 box cars with Magor Car Corp., and 100 gondola and 150 twin hopper cars with Bethlehem Steel Co.

Great Southern Lumber Co. is inquiring for one 2-8-2 type locomotive.

Green Bay & Western has ordered three 2-8-2 type locomotives from American Locomotive Co.

Argentine State Railways are inquiring for 550 box cars, 100 tank cars and 50

stock cars. Jorge Castro Madero is stores manager, San Jose 180, Buenos Aires, Argentina, South America.

Elgin, Joliet & Eastern will rebuild 300 box cars and purchase necessary parts.

E. A. Whitman, receiver for Wisconsin Central, has applied for authority to issue $525,000 in equipment trust certificates to aid in financing construction by Pullman Standard Car Mfg. Co. of 250 50-ton box cars. Total cost will be about $700,000.

Maine Central is inquiring for three locomotives.

Duluth, Mesabi & Northern is in the market for two locomotives.

RAILS AND TRACK SUPPLIES

Chicago Great Western has ordered 8000 tons of rails from Carnegie-Illinois Steel Corp. and 2000 tons from Inland Steel Co. It has also purchased about 9000 tons of accessories.

. . . CINCINNATI . . .

. . . *Sheet steel demand holds at peak rate.*

o o o

. . . *Pig iron shipments are steady.*

CINCINNATI, Sept. 8.—Reaffirmation of pig iron prices for fourth quarter failed to affect the district market. Melters are purchasing regularly for needs at an average rate of about 1200 tons a week and are apparently confident that a grace period will be allowed in the event of advances. Shipments on contract are moving steadily, furnace interests reporting that specifications are about up to date. A new stack has been placed in operation by the Hamilton Coke & Iron Co. replacing an old stack which was dismantled. First run iron is basic for American Rolling Mill Co., the new owner, but schedules call for partial production of merchant iron. Foundry operations are about 60 per cent of capacity.

Sheet steel is in steady demand at about 85 per cent of capacity. Mill operations are being taxed to keep abreast of current shipping requirements. Mill interests, in the face of the phenomenal August business, are somewhat disturbed over possible shortages if fourth quarter shows the normal percentage of increase over the current period. Orders are from widely scattered sources and reflect general interest in sheet steel. Speculative buying is absent, current business being for immediate consumption.

Ingot production is unchanged from last week, when the peak operation for the year to date was reached. Two interests are operating all open hearths.

. . CAST IRON PIPE . .

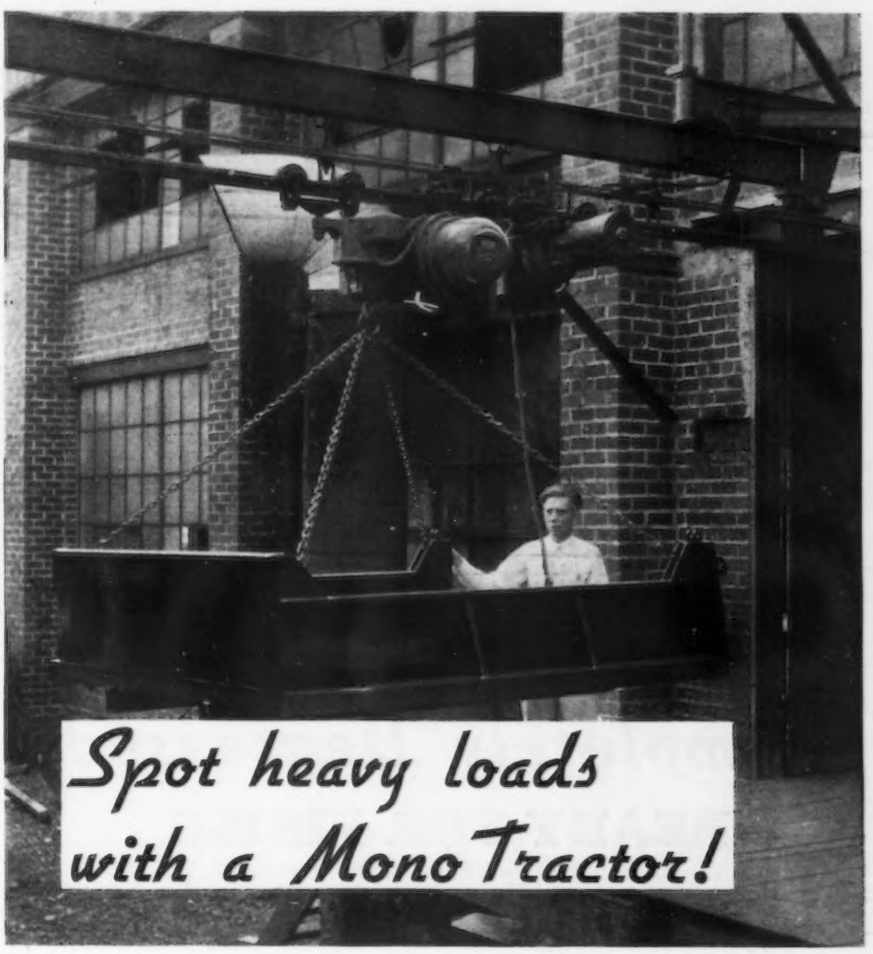
Seven Valleys, York County, Pa., plans pipe lines for water system; also reservoir and other waterworks installation. Fund of $33,000 is being arranged through Federal aid.

Camden, N. J., plans pipe lines for water supply in East Camden area, including main trunk lines. Financing is being arraged through Federal aid. Frank J. Hartmann is director of public works in charge.

Water Bureau, Detroit, plans about 5100 ft. of 72-in. for trunk line from Springwells pumping plant to northwestern section of city.

Jeffersonville, Ohio, plans pipe lines for water system and other waterworks installation. Cost about $61,000. Financing will be arranged through Federal aid. H. Collins Wight, Union Trust Building, Dayton, Ohio, is consulting engineer.

Corning, Ohio, has approved bond issue of $78,000 for pipe lines for water system and other waterworks installation.



Handling is easy in the Central Ohio Steel Products plant at Galion, Ohio. An electric hoist lifts heavy steel bodies and the American MonoTractor moves them anywhere on the MonoRail system with finger-tip control.

This powerful drive unit saves time by providing quick transportation of heavy loads. It reduces costs with automatic controls by eliminating handling.

A rubber drive wheel, geared to a single motor, offers increased tractive contact against the bottom of any smooth rail. Recent installations demonstrate automatic pick-up, dispatch, delivery and return for any number of operating cycles.

Our engineers will gladly give details and suggest a solution to your handling problems.

Write for new book on MonoTractor drive for Overhead Handling

AMERICAN MONORAIL CO.

13103 Athens Ave., Cleveland, O.

Madison, Ala., closes bids Sept. 15 for pipe lines for water system and other waterworks installation. Fund of $29,000 has been arranged.

St. Marys, Mo., closes bids Sept. 22 for pipe for water system and other waterworks installation. Bond issue of $30,000 has been approved for work. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

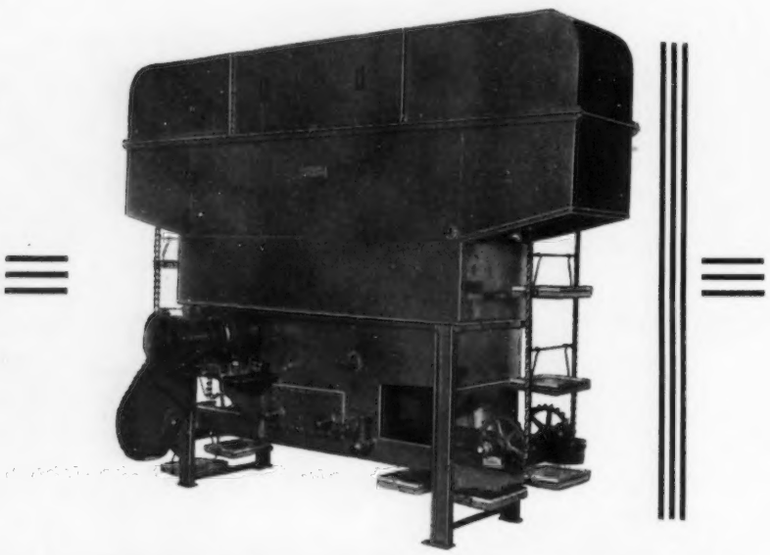
Wellington, Mo., will take bids soon for pipe for water system, elevated steel tank and tower, and other waterworks installation. Fund of $40,000 is being arranged through Federal aid. Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is consulting engineer.

Tulsa, Okla., plans about 35,000 ft. of 6-in., and 26,000 ft. of 2-in., for extensions in water system. Water Department, W. G. McMurry, superintendent, in charge.

Benton, Ark., plans pipe lines for water system and other waterworks installation. Fund of $36,000 has been secured through Federal aid.

Mountain Home, Ark., plans pipe lines for water supply, and other waterworks installation. Fund of $34,500 is being secured through Federal aid.

Wallace, Kan., plans about 13,600 ft. for water system; also 50,000-gal. elevated steel tank, pumping plant and other waterworks installation. Charles W. Suit, Garden City, Kan., is consulting engineer.



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Before going to spray booths, the work is fed through this Detrex* Degreasing Machine. As the conveyor carries the trays of the parts through, they are subjected to Perm-A-Clor vapors and come out perfectly clean and dry.

Absence of fire hazard (Perm-A-Clor is non-inflammable)—complete degreasing—reduced cleaning costs—better finish and elimination of rejects are some of the important reasons so many companies have adopted Detrex Degreasing.

One of the complete line of Detrex Machines will meet your degreasing needs. Ask for information.

*Reg. U. S. Pat. Off.

DETROIT REX PRODUCTS CO.

Manufacturers of a Complete Line of Alkali, Cleaners and Strippers

13005 Hillview Ave., Detroit, Mich.

....BUFFALO....

...Pig iron buying increases sharply.

o o o

...10 furnaces in blast, another to go.

BUFFALO, Sept. 8.—Bids will be taken Sept. 15 on one of the largest structural steel jobs in this vicinity in many months. The state of New York will accept tenders for 2500 tons of fabricated material and 1200 tons of reinforcing bars for a viaduct over Tifft Street in Buffalo.

A grade crossing elimination by the Pennsylvania Railroad at Blasdell, on which bids will be taken Sept. 10, will require 100 tons of structural steel. As work progresses on the lateral sewer connections for the Buffalo sewage disposal system, the authority is preparing to ask bids on the plant proper. Fabricators do not yet know what tonnage is involved. It is believed it will be a reinforcing bar job.

A Buffalo fabricator has the contract for 975 tons of structural steel for a furnace building for the Union Carbide and Carbon Co. plant at Niagara Falls.

The sold-up condition of most foundries as to future output has strengthened the pig iron market which has witnessed in the past few days a heavy buying movement. The possibility that the price may be increased has led foundries to volume commitments, the lots ranging from carloads up to 4000 and 5000 tons. Pig iron production in this district is the highest in years. Ten furnaces are blowing, (four Bethlehem, three Hanna, two Republic and the one at Tonawanda). Seven are idle, but at least three of the active furnaces, with a daily output of 1000 tons each, are equal to seven or eight of the older units. The Wickwire Spencer Steel Co. will put into its plant one of its long-idle blast furnaces soon after Oct. 1.

This week's open-hearth operation: Bethlehem's Lackawanna plant, 22; Republic Steel, 5; Wickwire Spencer, 1.

. . PHILADELPHIA . .

. . . Operations unchanged at 55 per cent of capacity.

o o o

. . . No district mill has yet announced fourth quarter prices.

o o o

. . . Mills continue to take orders at current price levels.

PHILADELPHIA, Sept. 9. — Worth Steel Co. has four furnaces on and expects to place another unit in operation early next week. All other district plants with the exception of Bethlehem are refining steel at a rate unchanged from last week. Fractional declines for Bethlehem offset the increase at Claymont, Del., and the average district operating rate is unchanged from last week at 55 per cent of capacity.

Semi-finished steel has been advanced $2 a ton for fourth quarter delivery by two mills and other producers will probably fall in line in the near future. Bars and small shapes also have advanced $2, and hot-rolled annealed sheets for No. 17 gage and lighter have advanced and changes have been made in gage, pickling and oiling extras.

No change has yet been made in wire products, and probably no announcement will be forthcoming for several weeks yet. Most sellers look for no advance. At the present time the question of delivery of wire products is more important than is price, with the exception of wire nails. This latter product has been marked down to a 1.90c. base in recognition of sustained weakness during recent weeks. Wire mills are attempting to clarify the status of jobbers and dealers, but it is believed that only a quantity differential selling setup will really solve the resale price situation.

Pig Iron

Releases of basic iron during August were considerably above those for July and deliveries of foundry grades showed a slight

Carnegie-Illinois Raises Prices

CARNEGIE-ILLINOIS Steel Corp.'s price announcement for fourth quarter, dated Pittsburgh, Sept. 5, states that "due to the advanced prices of scrap and other materials it will be necessary to increase the selling price $2 a ton on certain products." The products affected are re-rolling and forging blooms, billets and slabs, merchant bars and No. 24 gage hot rolled annealed sheets. Changes in extras on heavy hot-rolled sheets mean a net increase of $1 a ton on some gages and $2 a ton on No. 16 gage. Extras for pickling and oiling sheets have been combined so that a net reduction of $2 a ton is effected on some gages. The full text of the announcement is as follows:

The Carnegie-Illinois Steel Corp.'s announcement covering prices applying on sales for fourth quarter shipment includes the following delivered prices:

Rerolling Billets, Blooms and Slabs, Pittsburgh	$32.50 per Gross Ton
Rerolling Billets, Blooms and Slabs, Chicago or Gary	32.60 per Gross Ton
Sheet Bars, Pittsburgh	32.50 per Gross Ton
Sheet Bars, Chicago	32.60 per Gross Ton
Forging Blooms, Billets and Slabs, Pittsburgh	39.50 per Gross Ton
Forging Blooms, Billets and Slabs, Chicago or Gary	39.60 per Gross Ton
Hot-Rolled Carbon Steel Bars and Small Shapes, Pittsburgh	$2.075 per 100 lb.
Hot-Rolled Carbon Steel Bars and Small Shapes, Chicago or Gary	2.130 per 100 lb.
Hot-Rolled Strip, Pittsburgh	1.975 per 100 lb.
Hot-Rolled Strip, Chicago	2.080 per 100 lb.
Structural Shapes, Pittsburgh	1.925 per 100 lb.
Structural Shapes, Chicago	1.980 per 100 lb.
Plates, Pittsburgh	1.925 per 100 lb.
Plates, Chicago	1.980 per 100 lb.
Hot-Rolled Sheets, Pittsburgh—10-gage base	1.975 per 100 lb.
Hot-Rolled Sheets, Gary—10-gage base	2.080 per 100 lb.
Hot-Rolled Annealed Sheets, Pittsburgh—24-gage base	2.625 per 100 lb.
Hot-Rolled Annealed Sheets, Gary—24-gage base	2.730 per 100 lb.
Cold-Rolled Sheets:	
(Primes with seconds arising)—Pittsburgh—10-gage base	$2.625 per 100 lb.
(Primes with seconds arising)—Gary—10-gage base	2.730 per 100 lb.
(Primes with seconds arising)—Pittsburgh—20-gage base	3.075 per 100 lb.
(Primes with seconds arising)—Gary—20-gage base	3.180 per 100 lb.
Galvanized Sheets, Pittsburgh—24-gage base	3.225 per 100 lb.
Galvanized Sheets, Gary—24-gage base	3.330 per 100 lb.
Long Ternes, Unassorted, Pittsburgh—24-gage base	3.525 per 100 lb.
Long Ternes, Unassorted, Gary—24-gage base	3.630 per 100 lb.

The announcement also provides for the following reductions in the extras charged for pickling and oiling sheets:

12 gage and heavier	15c. instead of 25c.
13 gage to 16 gage, inc.	20c. instead of 30c.
17 gage to 21 gage, inc.	35c. instead of 45c.
22 gage and lighter	Unchanged at 45c.

The gage extras for hot-rolled sheets, as reflected by this producer's announcement, have been changed to read:

10 gage and heavier Base	12 gage . . . Add 10c.	14 gage . . . Add 20c.
11 gage . . . . . Add. 5c.	13 gage . . . . Add 15c.	15 gage . . . . Add 25c.
	16 gage . . . . Add 35c.	

The foregoing prices, which will apply on sales for shipment by the Carnegie-Illinois Steel Corp. to its customers during the fourth quarter, indicate that, due to the advanced prices of scrap and other materials, it will be necessary to increase the selling price $2 per ton on certain products.

improvement. So far, September activity has shown little change from the August average. With prices unchanged for the last quarter, most consumers are in no hurry to buy. In some cases, however, forward orders have been placed to avoid any possible hold-up in shipments arising from a sustained steel operating rate or a coke shortage during the winter months. Indicative of the promising outlook for the steel industry in this territory is the fact that the Alan Wood Steel Co. has considered blowing in its second blast furnace. No definite decision has yet been made, however.

Shapes and Bars

Structural awards are showing signs of improvement, but reinforcing steel remains inactive. Current reinforcing bar awards are small and future prospects are not particularly bright. Mill quotations are very firm, and no difficulty is being experienced with shading of resale prices by jobbers. The Virginia Bridge Co. was awarded 800 tons of shapes for an addition to the cellophane plant of the du Pont Co., Richmond, Va., Bethlehem Steel Co. received 235 tons for a highway bridge in McKean County, Pa., and the Phoenix Bridge Co. obtained 340 tons for a B. F. Goodrich Co. building in Oaks, Pa. It is estimated that about 64 bridges will be required to replace those destroyed by the flood last March. Of this number, only a few will take over 100 tons of shapes, so that the total amount of steel involved will probably be in the neighborhood of 7000 to 10,000 tons. Bids will be opened Sept. 18 at Harrisburg for several of these bridges, for which about 800 tons of shapes will be required.

Sheets and Plates

Carnegie-Illinois Steel Corp. has announced a $2 advance on the base price for hot-rolled annealed sheets of No. 17 gage and lighter, which establishes the fourth quarter delivered price at Philadelphia at 2.86c. a lb. For heavy hot-rolled sheets based on No. 10 gage, certain revisions were made in gage extras; Nos. 12 and 15 gage were advanced $1 and No. 16 gage will be $2 higher. For all gages, pickling and oiling extras were combined and in most instances the new extra is the same as the pickling extra alone had previously been. The exception applies to 22 gage and lighter, for which the new combined extra equals the sum of the previous pickling and oiling extras.

No other mill in this area has yet announced fourth quarter prices although several have indicated their intention of following the lead of the Corporation subsidiary. On the other hand, however, several district mills intimate that they may make no change. All mills are still freely taking orders at current price schedules for delivery at their convenience, and in most cases this convenience means delivery in the early fourth quarter.

No change is anticipated in plate prices. Orders showed a tendency to fall off during the past seven days, probably because of inactivity arising from the holiday period.

Imports

The following iron and steel imports were received here last week: 1438 tons of pig iron from British India; 100 tons of chrome ore from the Philippine Islands; 47 tons of steel tubes, 12 tons of steel forgings, 27 tons of cold drawn steel wire, 5 tons of steel billets and 21 tons of steel bars from Sweden; 23 tons of steel bars, 8 tons of steel bands and 115 tons of structural shapes from France, and 88 tons of steel bars, 10 tons of diamond plates, 88 tons of steel bands and 91 tons of structural shapes from Belgium.

National Acme Co., Cleveland, has sold its Windsor, Vt., plant to the Goodyear Tire & Rubber Co., Akron, Ohio, which will use it for the manufacture of tires. National Acme Co. dismantled the plant three years ago and moved its equipment to its Cleveland plant.

This Hand-Feed Machine saves Tool-Maker's time

Careful investigation has not only proved that a large proportion of toolroom jobs going into small surface grinders do not require automatic feeds, but that in most cases the work can be *done much faster* with this improved hand feed machine —at a corresponding saving of the Tool-Maker's time.

The NEW ABRASIVE No. 1½ SURFACE GRINDER

takes any job to 15" x 10" x 12". All feeds are operated by hand wheels of such ample size and convenient location that rapid operation is assured. The built-in motor is integral with the head, thereby eliminating belts, chains, and all other fast-moving parts except the spindle itself.

Because of the small number of moving parts, and the skillful proportioning of the metal in this modern grinder, vibration has been practically eliminated. The quality of work produced is therefore the highest obtainable. We recommend the New Abrasive No. 1½ Surface Grinder for the finest types of flat and form grinding, and for all types of gage grinding.

ABRASIVE MACHINE TOOL CO.

EAST PROVIDENCE, R. I.

. . . Awards of 2870 tons —7300 tons in new projects.

AWARDS

Peabody, Mass., 120 tons, State bridge, to Concrete Steel Co.

Concord, N. H., 100 tons, State bridge, to Bancroft & Martin Rolling Mills.

Battle Creek, Mich., 600 tons, post office, to Concrete Steel Co.

Batavia, Ill., 150 tons, Campana Corp., to Joseph T. Ryerson & Son, Inc.

Chicago, 900 tons, south section Lathrop housing project, to Joseph T. Ryerson & Son, Inc.

Chicago, 160 tons, Royal Blue Stores, to Calumet Steel Co.

Green River, Wyo., 120 tons, State underpass and approaches, to Omaha Steel Works.

San Francisco, 440 tons, material for Balboa, Canal Zone, to Bethlehem Steel Co.

Sacramento, Cal., 130 tons, high school auditorium, to an unnamed bidder.

Los Angeles, 150 tons, retaining wall on Aliso and Lyon Streets, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Monson, Mass., 120 tons, grade crossing.

Hightstown, N. J., 280 tons, highway work, route 25; bids Sept. 14.

Washington, 1750 tons, Government Printing Office warehouse; C. H. Tompkins Co., Washington, low bidder.

Buffalo, 1200 tons, Tifft Street viaduct; bids Sept. 15.

Chicago, 800 tons, north section Lathrop housing project.

Oak Park, Ill., 150 tons, Goldberg store.

Chicago, tonnage being figured, apartment building; Dubin & Dubin, architects.

Chicago, 400 tons, apartment building on Sheridan Road; Paul Olson, architect.

Alton, Ill., 150 tons, completion of lock and dam No. 26 in Mississippi River; bids Sept. 22.

Nevada, Mo., 130 tons, psychiatric clinic building; Winn Construction Co., St. Louis, low bidder on general contract.

Tucumcari, N. M., 1100 tons, dams.

Los Angeles, 156 tons, bridge across Santa Ana River; bids Sept. 24.

Los Angeles, 204 tons, State bridge over San Gabriel River, north of Santa Fe Springs; bids Sept. 24.

Olympia, Wash., 317 tons, over-crossing in Pierce County; bids Sept. 15.

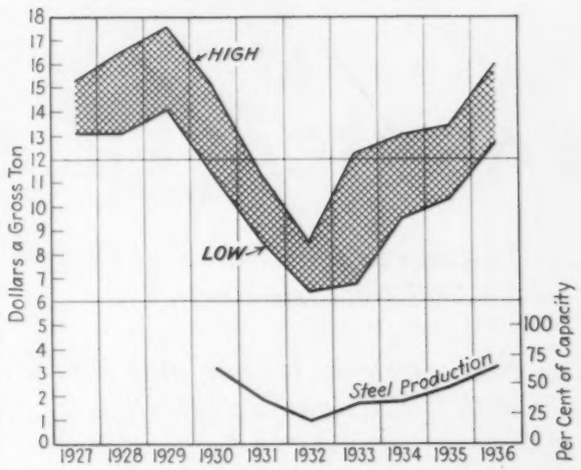
Denver, 226 tons, Columbia Basin project; bids opened.

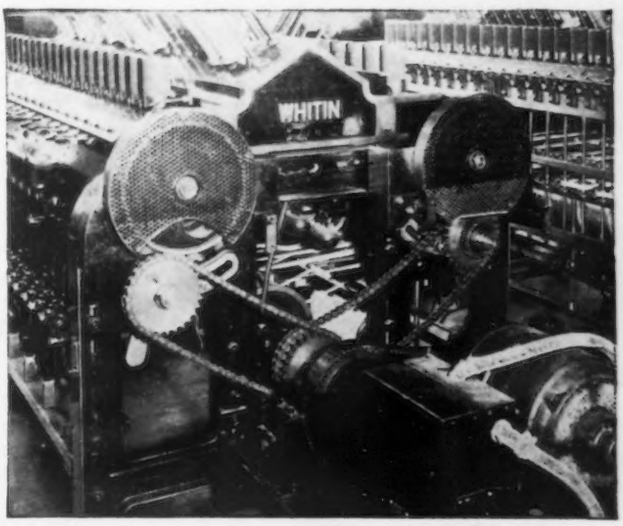
Denver, 175 tons, Parker Dam project; bids opened.

Denver, 140 tons, Salt River project; bids opened.

STEEL SCRAP APPROACHES 1929 LEVEL

AS indicated on the accompanying chart, the average price for heavy melting steel scrap in 1936 has advanced to a plane rivaling the 1929 market. The high mark for that year was $17.58 a gross ton, or only $1.58 above the present level. The low in 1929, which was reached toward the year's close, was $14.08, or $1.92 beneath the current $16 peak. The decline in the price structure which set in after 1929 carried quotations to a depression low in 1932 of $6.43. At its highest that year the market did not rise above $8.50.





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BALDWIN—DUCKWORTH

FABRICATED STEEL

. . . Lettings in fair volume at 21,935 tons as against 11,265 tons last week.

o o o

. . . New projects higher at 14,975 tons compared with 7525 tons a week ago.

o o o

. . . Plate awards total only 680 tons.

NORTH ATLANTIC STATES

New York, 4150 tons, hospital buildings on Welfare Island, to Harris Structural Steel Co., Plainfield, N. J.

New York, 150 tons, alteration to garment center capitol, to Taylor Fichter Steel Construction Co., New York.

Newark, 130 tons, P. Ballantine stock house, to Breen Iron Works.

Linden, N. J., 6500 tons, General Motors Corp. plant, to American Bridge Co.; general contract bids Sept. 16 to Albert Kahn, Detroit, architect.

Oaks, Pa., 350 tons, addition for B. F. Goodrich Co., to Phoenix Bridge Co., Phoenixville, Pa.

McKean County, Pa., 235 tons, highway bridge, to Bethlehem Steel Corp.

Niagara Falls, N. Y., 975 tons, furnace building for Union Carbide Co., to Bethlehem Steel Co.

SOUTH AND SOUTHWEST

Richmond, Va., 800 tons, duPont building, to Virginia Bridge Co.

Palm Beach, Fla., 175 tons, highway bridge, to Virginia Bridge Co.

Wilkinson County, Miss., 970 tons, bridge; 640 tons to Jones & Laughlin Steel Corp., 330 tons to Virginia Bridge Co.

Alcoa, Tenn., 300 tons, Aluminum Co. of America building extensions, to Fort Pitt Bridge Works Co.

Baytown, Tex., 165 tons, furnace steel, to Mosher Steel Co., Houston.

Seymour, Tex., 500 tons, bridge across Brazos River, to Bethlehem Steel Co.

CENTRAL STATES

Niles, Ohio. 850 tons, extensions for Republic Steel Corp., to Ohio Structural Steel Co., Newton Falls, Ohio.

Detroit, 150 tons, pipe bridge for Semet-Solvay Engineering Corp., to Lackawanna Steel Construction Co.

Detroit, 1050 tons, factory building for Kelvinator Corp., to Whitehead & Kales Co.

Saginaw, Mich., 330 tons, post office, to Bethlehem Steel Co.

East Chicago, Ind., 270 tons, cement mill for U. S. Gypsum Co., to Joseph P. Ryerson & Son, Inc.

Winneshick County, Iowa, 105 tons, beam span, to Clinton Bridge Works, Clinton, Iowa.

Wisconsin Rapids, Wis., 500 tons, dam, to Wisconsin Bridge & Iron Co., North Milwaukee.

WESTERN STATES

Los Angeles, 200 tons, boiler house extension for Shell Oil Co., to Bethlehem Steel Co.

Los Angeles, 150 tons, building for W. J. Sloan Co., to Pacific Iron & Steel Co.

Los Angeles, 1050 tons, butterfly sheds for Union Station, to Consolidated Steel Corp.

Los Angeles, 150 tons, material for Treasury Department, to an unnamed bidder.

Marysville, Cal., 340 tons, bridge for Southern Pacific Co., to Bethlehem Steel Co.

Glendale, Cal., 560 tons, bridge, to Consolidated Steel Corp.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Wallingford, Vt., 280 tons, highway bridge.

Stamford, Conn., 270 tons, high school.

State of New York, 2900 tons, four highway bridges.

Brooklyn, 1000 tons, hospital building.

Borough of Queens, 600 tons, construction shaft for East River tunnel.

Blasdell, N. Y., 100 tons, grade crossing elimination for Pennsylvania Railroad; bids Sept. 10.

Buffalo, 2500 tons, Tifft Street viaduct; bids Sept. 15.

Pittsburgh, 400 tons, building for Pittsburgh joint stock yards.

Emsworth, Pa., 3000 tons, gates for Emsworth dam.

State of Pennsylvania, 800 tons, highway bridges; bids Sept. 18.

CENTRAL STATES

Cleveland, 250 tons, Southerly sewage disposal plant; John Gill & Sons, low bidder.

Elyria, Ohio, 400 tons, building for Elyria Foundry Co.; bids taken. Previously reported as 200 tons.

Cincinnati, 300 tons, transmission towers for Cincinnati Gas & Electric Co.

State of Minnesota, 1000 tons, six highway bridges.

State of South Dakota, 700 tons, six highway bridges.

Chicago, 325 tons, underpass on Cicero Avenue.

East St. Louis, Ill., 600 tons, underpass.

FABRICATED PLATES

AWARDS

Louisville, 195 tons, two oil barges for Standard Oil Co. of Louisiana, to Ingalls Iron Works Co., Birmingham.

Louisville, 485 tons, three welded dump scows, to American Bridge Co.

SHEET PILING

AWARDS

Springdale, Pa., 245 tons, flood wall for Duquesne Light Co., to Carnegie-Illinois Steel Corp.

Langley Field, Va., 180 tons, Z piling, to Carnegie-Illinois Steel Corp.

Des Moines, Iowa, 130 tons for Treasury Procurement Division, to Bethlehem Steel Co.

NEW PROJECTS

Battle Creek, Mich., 250 tons, post office.

. . . Business quiet but new buying is expected.

o o o

. . . Pig iron production curtailed.

TORONTO, Ont., Sept. 8.—Business generally was quiet in the Canadian iron and steel markets during the week owing to the Labor Day holidays. Steel interests look for some forward delivery contract placing for last quarter. Railroads have not announced any new contracts for rails or rolling stock. The mining industry continues to furnish a good market for steel and steel products, and there has been some improvement in demand from the automotive industry recently.

In the merchant pig iron markets business is sluggish. Spot sales are being made in lots of 100 tons and under, with awards for the past week falling under 500 tons. Local blast furnace representatives, however, look for increased demand about the middle of this month. There has been no curtailment in foundry operations. There is, however, a possibility of slowing down in some branches of industry unless rail and rolling stock orders are forthcoming. Pig iron production has been curtailed, with only three stacks now blowing. Pig iron prices are firm and unchanged.

Trading in iron and steel scrap is spotty and confined to special grades. There is fair movement in heavy melting steel and odd shipments of turnings and other steel lines. New offerings are limited, but accumulations by railroads are expected on the market soon. Dealers have made no revision in price lists.

. . . NON-FERROUS . . .

. . . *Export copper surpasses domestic quotation.*

o o o

. . . *Tin prices advance; lead very active.*

NEW YORK, Sept. 9.—The feature in copper at present is the high price at which export sales are being made. The price has passed the domestic quotation and today is indicated to be about 9.80c. a lb., European ports, although 9.82½c. was reported paid in one instance. Producers state that a good volume of business has been transacted at these levels, with no sign of a let up immediately in sight. Domestic business has been less active, but bookings yesterday expanded to over 1000 tons, and the total for the month rose to about 4800 tons. The price is unchanged at 9.75c. a lb., Connecticut Valley, but the undertone with respect to a possible higher market before very long is a bit stronger.

Lead

Sales last week were about 15,000 tons, or approximately double the normal weekly volume. The buying is said to have gotten off to an equally good start this week, aided partly by pent-up demand which was unable to express itself Monday on account of the Labor Day interruption. Consumer interest is divided about one-third September and two-thirds October position, though of course the current month is largely covered while the period ahead is perhaps 35 per cent cared for. Shipments during August are thought to have ranged between 45,000 and 47,000 tons, and it is also predicted that refined stocks probably underwent a reduction of at least 8000 tons. The foreign market is reported stronger and higher in price, but quotations here remain at 4.45c. a lb., St. Louis basis.

Tin

This market continues to climb out of the slump that characterized it previous to two weeks ago. Business the latter half of the past week got under way in earnest, and on final trading before the close for Labor Day week-end the turnover was especially large. Prices have naturally made considerable headway, and today spot Straits metal at New York is quotable at 45.20c. a lb., more than 2c. higher than the price a week ago. The market abroad has not only been helped by the situation here but in addition has firmed in tone as a consequence of some good buying by the Consolidated Tin Smelters, an organization incidentally which belongs to the international restriction group. On first session in London this morning standard cash was quotable at £194, while three-months went for £191 15s. The Eastern market was indicated at £196 2s. 6d.

Zinc

The August statistics revealed shipments of all grades at 46,085 tons and production at 43,614 tons. During the month stocks underwent a reduction of about 2500 tons to 86,194 tons by Aug. 31. In prime Western grade alone stocks decreased only 498 tons. Unfilled orders at the end of the period were 65,173 tons, larger than for a considerable time and indicative of the well-covered position of consumers. While current demand for slab zinc is light, the market's undertone continues strong. The domestic price is firm and unchanged at 4.85c. a lb., East St. Louis basis. Zinc concentrate prices have advanced 50c. a ton.

The Week's Prices. Cents Per Pound for Early Delivery

	Sept. 2	Sept. 3	Sept. 4	Sept. 5	Sept. 8	Sept. 9
Electrolytic copper, Conn.*	9.75	9.75	9.75	9.75	9.75	9.75
Lake copper, N. Y.	9.87½	9.87½	9.87½	9.87½	9.87½	9.87½
Straits tin, Spot, New York	42.87½	42.87½	43.62½	....	44.62½	45.20
Zinc, East St. Louis	4.85	4.85	4.85	4.85	4.85	4.85
Zinc, New York†	5.22½	5.22½	5.22½	5.22½	5.22½	5.22½
Lead, St. Louis	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York	4.60	4.60	4.60	4.60	4.60	4.60

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb. delivered.
Aluminum, No. 12 remelt No. 2 standard, in carloads, 16.50c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.50c. a lb., New York.
Quicksilver, $78.00 to $80.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 9.50c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	46.00c. to 47.00c.
Tin, bar	48.00c. to 49.00c.
Copper, Lake	10.75c. to 11.75c.
Copper, electrolytic	10.75c. to 11.75c.
Copper, castings	10.50c. to 11.50c.
*Copper sheets, hot-rolled	17.25c.
*High brass sheets.	15.37½c.
*Seamless brass tubes	17.62½c.
*Seamless copper tubes	17.75c.
*Brass rods	13.37½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig.	5.10c. to 6.10c.
Lead, bar	6.10c. to 7.10c.
Lead, Sheets, cut	8.25c.
Antimony, Asiatic	13.00c. to 14.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	28.50c. to 29.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	48.50c.
Tin, bar	50.50c.
Copper, Lake	10.50c. to 10.75c.
Copper, electrolytic	10.50c. to 10.75c.
Copper, castings	10.25c. to 10.50c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig.	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	15.50c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	51.50c.
Solder, ½ and ½	26.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.50c.	8.25c.
Copper, hvy. and wire	7.37½c.	7.87½c.
Copper, light and bottoms	6.37½c.	6.87½c.
Brass, heavy	4.25c.	4.87½c.
Brass, light	3.50c.	4.25c.
Hvy. machine composition	6.25c.	6.75c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or compos. turnings	5.87½c.	6.37½c.
Lead, heavy	3.62½c.	4.00c.
Sheet aluminum	13.25c.	14.75c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.

IRON AND STEEL SCRAP

. . . Advances at Pittsburgh and Chicago force scrap composite to $16.25; highest since Sept. 24, 1929.

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. . . No. 1 steel on Pennsylvania Railroad list brought over $18.

BROKERS continue to supply the major amount of activity in principal consuming centers, and, mostly because of this covering of short positions, prices have risen 25c. at Pittsburgh and 50c. at Chicago. Consequently the scrap composite has lifted 25c. to $16.25, the highest figure established since Sept. 24, 1929. This persistent upward trend in quotations, reflecting an unusual rate of consumption and restricted supplies, has again carried the scrap composite nearer parity with the composite pig iron price than it has been since 1929.

Pittsburgh

The market has continued to show further strength. Heavy melting is up 25c. and is now quotable at $17.25 to $17.75. During the past week brokers have been paying $17.25 and some have paid as high as $17.75. Although dealers are not short as much tonnage as a week ago, a considerable amount still remains to be covered. With the last purchase having been at $17.50, brokers are now asking $18, and, in view of the heavy operations expected at the end of this month and next month, mills will probably have to pay that figure or more.

Chicago

Speculation and optimism prevail in this market, and prices continue to rise. Heavy melting steel no longer changes hands at $16, the minimum being above the $16.25 mark, and railroads are obtaining up to $16.08. Quotations to consumers are on the basis of $16 to $16.50 a ton, delivered. Brokers are meeting with more competition by eastern sellers in fields as far away as Texas, and there is some apprehension concerning future supplies not only in the heavy tonnage trades but also of specialties, prices for which remain very strong.

Philadelphia

This market is beset with rumors and misinformation, and what its true status is no one knows. It is generally admitted that several sales of steel have been made, but both buyers and sellers refuse to divulge either the selling figures or the tonnages involved. Some dealers are receiving occasional fancy prices as brokers attempt to cover their short positions on these orders, but, on the other hand, sentiment received a blow when Bethlehem retired from the market for delivery to Bethlehem, Steelton and Lackawanna. All factors considered, the market can be regarded as practically unchanged from last week with brokers holding out for prices equal to or above quoted levels and mills keeping purchases to a minimum and awaiting a definite break in quotations. It is generally concluded, however, that the next No. 1 sale will be at $15.50 or better.

Cleveland

A Valley district consumer purchased a small tonnage of heavy melting steel during the week at $17.25 and another paid $17.50 for the same grade, both sales being for rather small lots. The New York Central Railroad sold 5000 tons of No. 1 steel at $17.50 to a Youngstown broker. This railroad's couplers, knuckles and steel wheels brought $18.25 and cast iron wheels $17.50, a $2 a ton advance for wheels over the last sale. Some steel-making scrap is being shipped from Cleveland to Youngstown, as the local market is inactive. Valley prices on steel-making grades are up 50c. a ton. The local market is very firm and while quotations on most grades are unchanged the maximum figure in the spread of local prices now more fairly represents the market. Local consumers are paying $10.50 for blast furnace scrap in small lots. Short rails have advanced sharply and cast scrap and billet crops have advanced $1 a ton.

Detroit

The market continues very strong as supply remains low due to automotive inactivity. Dealers are selling only what is in sight, and mills seem ready to take what is available at any price. The feature of last week's market was the shipment by a Cleveland broker of 2500 tons of bundles to Buffalo from a local dock.

St. Louis

Dealers have made further price advances in an effort to stimulate offerings to cover a heavy short interest. Little scrap is coming in from the country, and railroad offerings are light. The only railroad list closing this week is the Missouri Pacific list, involving 60 carloads.

Cincinnati

The old materials market is featured by the steady uptrend of dealers' bids. Needing material for old commitments or anticipating imminent mill ordering, dealers bid eagerly for material available. In fact, some of the trade anticipate a shortage of material, and short positions are greatly feared. Small lots were ordered by local consumers the past week, but this business was not sufficient to establish a trend.

New York

The market here is very strong. Dealers and brokers are paying 50c. more for No. 1 steel, and some other items have advanced in sympathy. The Pennsylvania and New York Central railroad lists disposed of last week brought attractive prices. Supplies in general are coming out laggardly, and mills already contracted are pressing for shipment. Export movement has dwindled as, in competition with the strong home consumption, material for foreign account is hard to obtain. No new export sales are being made.

Buffalo

The market continues very strong, though there are few important transactions locally. An unnamed tonnage of No. 1 steel was sold to a Buffalo mill during the week at $15, but this is no longer regarded as an attractive price. This mill is understood to have paid the equivalent of $15.50 and $16, Buffalo, for No. 1 steel out of Michigan. The mill which paid $15 is said now to be out of the market, though dealers are authority for the statement that its stockpile, in the face of extremely heavy operation, probably does not amount to more than 30,000 tons. It is regarded as certain that the next purchases of No. 1 will be above $15.

Boston

The market for domestic delivery is active and strong, but for export is somewhat subdued because the cost of scrap is above levels at which exporters contracted. Shipments of No. 1 steel to Worcester, Mass., are running heavy, with brokers obtaining as high as $13.25, delivered. One sale of steel turnings for Pennsylvania delivery was made at $6.40 a ton, f.o.b., the past week, but average lots went at $5.90.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.25 to $17.75
No. 2 hvy. mltng. steel.	16.00 to 16.50
No. 2 RR. wrought	17.25 to 17.75
Scrap rails	17.25 to 17.75
Rails, 3 ft. and under	19.00 to 19.50
Comp. sheet steel	17.25 to 17.75
Hand bundled sheets	16.25 to 16.75
Hvy. steel axle turn.	15.75 to 16.25
Machine shop turn.	12.00 to 12.50
Short shov. turn.	12.00 to 12.50
Mixed bor. & turn.	11.00 to 11.50
Cast iron borings	12.00 to 12.50
Cast iron carwheels	16.50 to 17.00
Hvy. breakable cast	14.50 to 15.00
No. 1 cast	16.00 to 16.50
RR. knuckles & cplrs.	19.50 to 20.00
Rail coil & leaf springs	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Low phos. billet crops.	20.00 to 20.50
Low phos. sh. bar.	19.50 to 20.00
Low phos. punchings.	19.00 to 19.50
Low phos. plate scrap.	19.00 to 19.50
Steel car axles	17.50 to 18.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Comp. sheet steel	14.50 to 15.00
Light bund. stampings	10.00 to 10.50
Drop forge flashings.	14.00 to 14.50
Machine shop turn.	9.50 to 10.00
Short shov. turn.	10.00 to 10.50
No. 1 busheling	14.00 to 14.50
Steel axle turnings	10.50 to 11.00
Low phos. billet crops	19.00 to 19.50
Cast iron borings	10.00 to 10.50
Mixed bor. & turn.	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
No. 1 cast	16.00 to 16.50
Railroad grate bars	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	**16.50 to 17.00**
Railroad malleable	**17.00 to 17.50**
Cast iron carwheels	**15.50**

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00
No. 2 hvy. mltng. steel.	$13.50 to 14.00
Hydraulic bund., new	14.00 to 14.50
Hydraulic bund., old	11.50 to 12.00
Steel rails for rolling	15.50 to 16.00
Cast iron carwheels	16.00 to 16.50
Hvy. breakable cast	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	12.50 to 13.00
Railroad malleable	**16.50**
Machine shop turn.	9.50 to 10.00
No. 1 blast furnace	7.50 to 8.00
Cast borings	7.50 to 8.00
Heavy axle turnings	12.50 to 13.00
No. 1 low phos. hvy.	18.00 to 18.50
Couplers & knuckles	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Steel axles	18.50 to 19.00
Shafting	**19.50 to 20.00**
No. 1 RR. wrought	**14.50 to 15.00**
Spec. iron & steel pipe.	**12.50 to 13.00**
Bundled sheets	**12.00 to 12.50**
No. 1 forge fire	**13.50 to 14.00**
Cast borings (chem.)	**10.50 to 13.00**

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.	$16.00 to $16.50
Auto. hvy. mltng. steel.	14.00 to 14.50
Shoveling steel	16.00 to 16.50
Hydraul. comp. sheets.	15.00 to 15.50
Drop forge flashings.	13.50 to 14.00
No. 1 busheling	**14.75 to 15.25**
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs	**17.00 to 17.50**
Axle turnings	14.25 to 14.75
Steel coup. & knuckles	18.00 to 18.50
Coil springs	18.50 to 19.00
Axle turn. (elec.)	15.00 to 15.50
Low phos. punchings.	18.00 to 18.50
Low phos. plates, 12 in. and under	18.00 to 18.50
Cast iron borings	9.00 to 9.50
Short shov. turnings.	10.00 to 10.50
Machine shop turn.	8.50 to 9.00
Rerolling rails	16.50 to 17.00
Steel rails under 3 ft.	**17.00 to 17.50**
Steel rails under 2 ft.	**18.00 to 18.50**
Angle bars, steel	17.50 to 18.00
Cast iron carwheels	16.00 to 16.50
Railroad malleable	18.00 to 18.50
Agric. malleable	15.00 to 15.00
	Per Net Ton
Iron car axles	$18.50 to $19.00
Steel car axles	17.75 to 18.25
No. 1 RR. wrought	14.25 to 14.75
No. 2 RR. wrought	$14.25 to $14.75
No. 2 busheling, old	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast	13.50 to 14.00
Clean auto. cast	12.50 to 13.00
No. 1 railroad cast	13.00 to 13.50
No. 1 agric. cast	11.00 to 11.50
Stove plate	8.50 to 9.00
Grate bars	9.50 to 10.00
Brake shoes	10.00 to 10.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$14.50 to $15.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Scrap rails	14.00 to 14.50
New hy. b'ndled sheets	13.50 to 14.00
Old hydraul. bundles.	12.50 to 13.00
Drop forge flashings.	13.50 to 14.00
No. 1 busheling	13.50 to 14.00
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	7.50 to 8.50
Knuckles & couplers.	17.00 to 17.50
Coil & leaf springs.	17.00 to 17.50
Rolled steel wheels.	17.00 to 17.50
Low phos. billet crops.	17.50 to 18.00
Short shov. turnings.	9.50 to 10.00
Mixed Bor. & turn.	9.00 to 9.50
Cast iron borings	9.00 to 9.50
No. 2 busheling	10.00 to 11.00
Steel car axles	17.00 to 17.50
Iron axles	**12.00 to 12.50**
No. 1 machinery cast.	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Steel rails under 3 ft.	17.00 to 17.50
Cast iron carwheels.	13.00 to 14.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.	$11.50
Scrap steel rails	$12.00 to 12.50
Short shov. turnings.	8.00
Stove plates	8.00
Steel axles	13.50 to 14.00
Iron axles	13.50 to 14.00
No. 1 RR. wrought	8.50 to 9.00
Rails for rolling	13.50 to 14.00
No. 1 cast	12.50
Tramcar wheels	12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. steel.	$14.00 to $14.50
No. 1 hvy. melting.	13.25 to 13.75
No. 2 hvy. melting.	11.50 to 12.00
No. 1 locomotive tires.	**12.00 to 12.50**
Misc. stand.-sec. rails.	14.50 to 15.00
Railroad springs	15.50 to 16.00
Bundled sheets	**9.50 to 10.00**
No. 2 RR. wrought.	13.00 to 13.50
No. 1 busheling	**8.50 to 9.00**
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	**15.00 to 15.50**
Machine shop turn.	**4.00 to 4.50**
Heavy turnings	**9.25 to 9.75**
Steel car axles	16.00 to 16.50
Iron car axles	17.00 to 17.50
No. 1 RR. wrought.	12.00 to 12.50
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	15.50 to 16.00
Cast iron carwheels.	12.75 to 13.25
No. 1 machinery cast.	**10.75 to 11.25**
Railroad malleable.	15.00 to 15.50
No. 1 railroad cast.	**11.00 to 11.50**
Stove plate	**7.50 to 8.00**
Agricul. malleable	12.50 to 13.00
Grate bars	**9.00 to 9.50**
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	10.50 to 11.00
Scrap rails for mltng.	13.50 to 14.00
Loose sheet clippings.	8.00 to 8.50
Bundled sheets	10.00 to 10.50
Cast iron borings	6.00 to 6.50
Machine shop turn.	7.00 to 7.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.25 to 6.75
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires.	12.00 to 12.50
Short rails	16.50 to 17.00
Cast iron carwheels.	13.00 to 13.50
No. 1 machinery cast.	13.50 to 14.00
No. 1 railroad cast.	13.00 to 13.50
Burnt cast	9.50 to 10.00
Stove plates	9.50 to 10.00
Agricult. malleable	12.00 to 12.50
Railroad malleable	14.50 to 15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.25 to $13.75
No. 2 hvy. mltng. steel.	12.00 to 12.50
Borings and turnings.	8.25 to 8.75
Long turnings	$8.50 to $9.00
Short shov. turnings.	9.00 to 9.50
No. 1 machinery cast.	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets.	13.75 to 14.25
Stove plates	8.50 to 9.00
New factory bushel.	12.50 to 13.00
Old No. 2 busheling	8.00 to 8.50
Sheet clippings	10.00 to 10.50
Flashings	11.50 to 12.00
Low phos. plate scrap.	13.50 to 14.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Hvy. melting steel.	$7.50	$7.00
Rails, scrap	8.50	8.00
Machine shop turn.	4.00	4.00
Boiler plate	7.00	6.00
Hvy. axle turnings.	4.50	4.00
Cast borings	5.00	4.50
Steel borings	4.00	4.00
Wrought pipe	4.00	4.00
Steel axles	8.50	9.00
Axles, wrought iron.	9.00	9.50
No. 1 machinery cast.	11.50	11.00
Stove plate	7.50	7.00
Standard carwheels	11.00	10.50
Malleable	7.00	7.00
Shoveling steel	6.50	6.00
Bushelings	6.00	5.50
Compressed sheets	6.50	6.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00 to $17.50
Hydraulic bundles	16.50 to 17.00
Machine shop turn.	11.50 to 12.00

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	10.50 to 11.00
Hvy. breakable cast.	11.50 to 12.00
No. 1 machinery cast.	11.50 to 12.00
No 2 cast	10.25 to 10.75
Stove plate	8.50 to 9.00
Steel car axles	15.00 to 16.00
Shafting	14.50 to 15.00
No. 1 RR. wrought	12.00 to 12.50
No. 1 wrought long.	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	11.00 to 11.50
Short shov. turnings.	5.75 to 6.25
Machine shop turn.	6.25 to 6.50
Cast borings	6.25 to 6.50
No. 1 blast furnace	4.00 to 5.00
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap.	6.50 to 7.00

Per gross ton, delivered local foundries:

No. 1 machn. cast.	$13.00 to $13.50
No. 1 hvy. cast cupola.	11.00 to 11.50
No. 2 cast	9.00 to 9.50

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.15 to $11.40
Scrap rails	11.40 to 11.65
No. 2 steel	10.15 to 10.40
Breakable cast	10.00 to 10.25
Machine shop turn.	5.90
Bund. skeleton long.	8.90
Shafting	14.25 to 14.50
Cast bor. chemical.	5.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	$12.00 to $13.50
No. 1 machine cast	12.00 to 13.50
Stove plate	9.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	$12.25 to $12.50
No. 2 hvy. mltng. steel.	11.25 to 11.50
No. 2 cast	9.50 to 10.00
Stove plate	8.50 to 9.00
Rails (scrap)	10.50 to 11.00

Boston, on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$12.00
No. 2 hvy. mltng steel.	11.00
Rails (scrap)	$12.00 to 12.25
Stove plate	7.75
Machine shop turn.	5.75

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$10.00 to $10.50
No. 2 hvy. mltng. steel.	9.00 to 9.50

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$30.00
Forging quality	37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$30.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c.

Wire Rods

(Nos. 4 and 5)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$38.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	1.95c.
F.o.b. Chicago or Gary	2.00c.
F.o.b. Duluth	2.10c.
Del'd Detroit	2.10c.
F.o.b. Cleveland	2.00c.
F.o.b. Buffalo	2.05c.
Del'd Philadelphia	2.26c.
Del'd New York	2.30c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.35c.
F.o.b. cars Pacific ports	2.50c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.80c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.10c.
Del'd Detroit	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Cleveland, Chicago and Gary	2.30c.
F.o.b. Buffalo	2.35c.
Del'd Detroit	2.40c.
Del'd eastern Michigan	2.45c.

*In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago or Gary	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Coatesville or Spar. Pt.	2.00c.
Del'd Philadelphia	2.09c.
Del'd New York	2.19c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.45c.
F.o.b. Chicago	3.50c.
F.o.b. Coatesville	3.55c.
F.o.b. cars dock Gulf ports	3.85c.
F.o.b. cars dock Pacific ports	4.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Buffalo or Bethlehem	2.00c.
Del'd Philadelphia	2.115c.
Del'd New York	2.1625c.
F.o.b. Birmingham (standard)	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Buffalo	2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes	2.75c.
Tie plates, steel	2.00c.
Tie plates, Pacific Coast ports	2.10c.
Track bolts, to steam railroads	3.75c.
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.95c.
No. 10, f.o.b. Gary	2.05c.
No. 10, del'd Detroit	2.15c.
No. 10, del'd Philadelphia	2.26c.
No. 10, f.o.b. Birmingham	2.10c.
No. 10, f.o.b. cars dock Pacific ports	2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.50c.
No. 24, f.o.b. Gary	2.60c.
No. 24, del'd Detroit	2.70c.
No. 24, del'd Philadelphia	2.81c.
No. 24, f.o.b. Birmingham	2.65c.
No. 24, f.o.b. cars dock Pacific ports	3.15c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.60c.
No. 10 gage, f.o.b. Gary	2.70c.
No 10 gage, f.o.b. Detroit	2.80c.
No. 10 gage, del'd Philadelphia	2.91c.
No. 10 gage, f.o.b. Birmingham	2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.05c.
No. 20 gage, f.o.b. Gary	3.15c.
No. 20 gage, del'd Detroit	3.25c.
No. 20 gage, del'd Philadelphia	3.36c.
No. 20 gage, f.o.b. Birmingham	3.20c.
No. 20 f.o.b. cars dock Pacific ports	3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.20c.
No. 24, f.o.b. Gary	3.30c.
No. 24, del'd Philadelphia	3.51c.
No. 24, f.o.b. Birmingham	3.35c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	4.95c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	2.90c.
Armature	3.25c.
Electrical	3.75c.
Special Motor	4.80c.
Special Dynamo	5.50c.
Transformer	6.00c
Transformer Special	7.00c.
Transformer Extra Special	7.50c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras, plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.50c.
F.o.b. Gary	3.60c.
F.o.b. cars dock Pacific ports	4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.05c.
No. 20, f.o.b. Gary	3.15c.
No. 20, f.o.b. Birmingham	3.65c.
No. 20, f.o.b. cars dock Pacific ports	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c
No. 28, cars dock Pacific ports	3.35c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pgh.	1.95c.
All widths up to 24 in., Chicago	2.05c.
All widths up to 24 in., del'd Detroit	2.15c.
All widths up to 24 in., Birmingham	2.10c.
Cooperage stock, Pittsburgh	2.05c.
Cooperage stock, Chicago	2.15c.

Cold-Rolled Strips*

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

	Pittsburgh and Cleveland	Worcester
Carbon 0.25-0.50%	2.60c.	2.80c.
Carbon .51- .75	3.45c.	3.65c.
Carbon .76-1.00	4.95c.	5.15c.
Carbon Over 1.00	6.50c.	6.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.40c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$1.90
Smooth coated nails	1.90

	Base per 100 Lb.
Annealed fence wire	$2.65
Galvanized fence wire	3.00
Polished staples	2.60
Galvanized staples	2.85
Barbed wire, galvanized	2.40
Twisted barbless wire	2.40
Woven wire fence, base column	57
Single loop bale ties, base column	51

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	57	37	⅛	+91½	+138
¼ to ⅜	60	44½	¼ & ⅜	+1½	+21½
½	64½	55	½	31½	15
¾	67½	59	¾	36½	20½
1 to 3	69½	61½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	62	53½	2	37	22½
2½ to 3.65		56½	2½ to 3½	38	25
3½ to 6.67		58½	4 to 8	40	28½
7 & 8.66		56½	9 to 12	38	24½
9 & 10.65½		56			
11 & 12.64½		55			

Butt Weld, extra strong, plain ends

⅛	55½	42½	⅛	+13	+45½
¼ to ⅜	57½	46½	¼ & ⅜	+2½	+34½
½	62½	54½	½	32½	17½
¾	66½	58½	¾	37½	22½
1 to 3	68	61	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	60	52½	2	40	26
2½ to 3.64		56½	2½ to 4.45½		33
3½ to 6.67½		60	4½ to 6.45		33½
7 & 8	66½	57	7 & 8	46	33
9 & 10	65½	56	9 to 12.41½		30
11 & 12	64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2¼ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb.	or ft. to	39,999 lb.	or ft.	5 %
12,000 lb.	or ft. to	24,999 lb.	or ft.	12½%
6,000 lb.	or ft. to	11,999 lb.	or ft.	25 %
2,000 lb.	or ft. to	5,999 lb.	or ft.	35 %
Under 2,000 lb.	or ft.			50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$48.40
6-in. and larger, del'd New York	45.20
*6-in. and larger, Birmingham	40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	40.50
F.o.b. dock, Seattle	51.50

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39, Birmingham, and $47.40, delivered Chicago and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. x 6 in. and smaller	70 and 10
Larger than ½ in.	70 and 5
Lag bolts	70 and 5
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 5
Hot-pressed nuts, blank or tapped, square	70 and 5
Hot-pressed nuts, blank or tapped, hexagon	70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 10
Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 5
Stove bolts in bulk	82½
Tire bolts	50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	$3.05
F.o.b. Chicago or Birmingham	3.15

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base..... 2.55c. Delivered price at Detroit is.. 2.70c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. base per lb. Delivered Detroit, 3.20c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	57½c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15¾c.
Regular	12½c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Based on Exchange rate as of Aug. 31

Ferromanganese, export	$45.24
Billets, open-hearth	29.57 to $30.83
Tin plate, per base box	4.77 to 4.80
Steel bars, open-hearth	39.58
Beams, open-hearth	38.33
Channels, open-hearth	39.58
Angles, open-hearth	38.33
Black sheets, No. 24 gage	51.42
Galvanized sheets, No. 24 gage	61.45

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports

Based on Exchange rate of Aug. 31

Billets, Thomas	$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, ¼ in. and up	35.42
Plate, 3/16 in. and 5 mm.	34.85
Sheets, ⅛ in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.05c.
Reinforcing steel bars	3.05c.
Cold-finished and screw stock:	
Rounds and hexagons	3.50c.
Squares and flats	3.50c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.35c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.77
Spikes, large	3.10c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.65
Wire, black, soft ann'l'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg	2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.10c.
Soft steel bars, squares and hexagons	3.25c.
Cold-fin. steel bars:	
Rounds and hexagons	3.65c.
Flats and squares	3.65c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	3.95c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.70c.
Track bolts (keg lots)	4.70c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.
	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	87½
Cut point set screws	75 and 10
Flat head bright wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.95
Com. wire nails, 50 kegs or more	2.40c.†
Cement c't'd nails, 50 kegs or more	2.40c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants wihtin the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.41c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.96c.
Flats and squares	3.96c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.66c.
Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 3.99c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terne sheets (No. 24)	5.25c. to 5.35c.
Armco iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvannealed (No. 24†)	5.75c.
Armco iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco iron hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate ⅛ in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	3.75c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	$3.21
	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

	Base per Lb
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.35c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.50c.
Cold-fin. rounds, shafting, screw stock	3.90c.
Hot-rolled annealed sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.20c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.00c.
Boiler rivets	4.10c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.15c.
‡Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.91c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.75c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.41c.
Soft steel bars	3.00c.
‡Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.65c.
Flat-rolled steel under ¼ in.	3.46c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.21c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.46c.
*Black ann'l'd wire, per 100 lb.	$2.85
*No. 9 galv. wire, per 100 lb.	3.20
*Com. wire nails, base per keg	2.30

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Bars, rounds, flats and angles	3.32c.
Other shapes	3.47c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.87c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more	4.62c.
Galv. sheets (No. 24) 500 lb. or less	4.47c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.15c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.70c.
Rounds and hex.	3.70c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg	$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Beams, channels, angles, tees, zees	3.64c.
H beams and shapes	3.64c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.66c.
Floor plates, diamond pattern	5.46c.
Bar and bar shapes (mild steel)	3.55c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.75c. to 4.75c.
Half rounds, half ovals, ovals and bevels	4.80c.
Tire steel	4.80c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	4.05c.
Cold-finished flats	4.05c.
Blue annealed sheets, No. 10 ga.	3.75c.
One pass cold-rolled sheets No. 24 ga.	4.30c.
Galvanized steel sheets, No. 24 ga.	4.30c.
Lead coated sheets, No. 24 ga.	5.85c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.19c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.04c.
Hot-rolled sheets (No. 10)**	3.24c.
Galvanized sheets (No. 24)	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.74c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.
Bolts and nuts, in cases,	70 and 10 per cent off list
Broken cases	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.21c.
Soft steel bars, squares and hexagons	3.36c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)	3.26c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Galvanized sheets (No. 20)	4.76c.
Cold-finished steel bars	3.76c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	4.01c.
Boiler rivets, cone head (keg lots)	4.11c.
Track spikes (keg lots)	3.91c.
Track bolts (keg lots)	4.91c.
Black annealed wire	3.40c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

	Per Cent Off List
Machine bolts, carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.35c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	3.90c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.20c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild Steel bars and small shapes	3.10c.
Structural shapes	3.10c.
Reinforcing bars	....prices on application
Plates	3.10c.
Hot-rolled sheets, No. 10	3.20c.
Bands	3.30c.
Hoops	3.55c.
Special threading steel	3.20c.
Diamond pattern floor plates ¼ in. and heavier	5.10c.
Galvanized bars and small shapes	5.60c.
Galvanized bands	5.80c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	3.88c.

All prices are for 2000 lb. and more.

For second zone add 10c. per 100 lb. for trucking.

List size extras of Aug. 15, 1935, and cutting extras to be added.

For cold-rolled products, list size extras from Jan. 1, 1936, and cutting extras to be added.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10	3.46c.
Hot-rolled annealed sheets No. 24*	3.41c.
Galvanized sheets, No. 24*	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24	5.07c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list.	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.45c.
Reinforcing bars	3.50c.
Structural shapes	3.65c.
Plates	3.65c.
Hot-rolled sheets, No. 10	3.65c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.05c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.65
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.50c.	3.60c.	3.55c.
Shapes, standard	3.50c.	3.60c.	3.55c.
Soft steel bars	3.50c.	3.60c.	3.70c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.20c.	4.15c.	4.40c.
Hot-rolled sheets (No. 10)	3.60c.	3.70c.	3.75c.
Galv. sheets (No. 24 and lighter)	5.00c.	4.40c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.60c.	5.00c.
Cold finished steel Rounds	5.95c.	6.00c.	6.00c.
Squares and hexagons	7.20c.	7.25c.	7.25c.
Flats	7.30c.	7.75c.	8.25c.
Common wire nails—base per keg less carload	$2.90	$2.90	$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$45.00
High-heat duty, New Jersey	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	40.00
Intermediate, New Jersey	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	$48 to 50.00
Silica cement per net ton	8.00

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	$20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	19.82
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.88

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia	20.8132
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	18.82
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.	$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham	20.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$24.00

Gray Forge

Valley or Pittsburgh furnace	$19.00

Charcoal

Lake Superior furnace	$22.00
Delivered Chicago	25.2528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto.

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$75.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	130.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$22.75

For each additional 0.5% silicon up to 12%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$27.75
10.51 to 11.00%	28.25
11.00 to 11.50%	28.75
11.51 to 12.00%	29.25
12.01 to 12.50%	29.75
12.51 to 13.00%	30.25
13.01 to 13.50%	30.75
13.51 to 14.00%	31.25
14.01 to 14.50%	31.75
14.51 to 15.00%	32.25
15.01 to 15.50%	32.75
15.51 to 16.00%	33.25
16.01 to 16.50%	33.75
16.51 to 17.00%	34.25

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...	$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry Spain or Algeria	10.25c.
Iron, low phos., Swedish, average, 63½% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	26c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	26c.
Man., Brazilian, 46 to 48½%	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered	$15.25 to $15.50
Tungsten, domestic, scheelite delivered, nominal	15.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.50 to 17.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic ports	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00
Domestic, barge and rail	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	5.00c.
Del'd Ch'go, No. 5 industrial	3.77c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd, No. 4 industrial	5.50c.
Del'd Cleve'd, No. 5 industrial	5.00c.

COKE AND COAL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.65 to $3.75
Foundry, f.o.b. Connellsville Prompt	4.00 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	11.50
Foundry, by-product, del'd Newark or Jersey City	9.65
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, delivered Cleveland	9.75
Foundry, by-product, delivered Cincinnati	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Machine tool industry enters busy fall season.

o o o

. . . Distributers generally are optimistic.

o o o

. . . Line-production buying is not very active.

By L. M. WAITE

WITH machine tool buying well sustained throughout August and reports of a sustained satisfactory volume of orders into September, the outlook appears to be good for the machine tool builder and distributer. The outstanding drawback is delivery. Most of the current business continues to spring from requirements for single machines; however, the past two weeks have shown considerable buying in lots up to four and six machines. In some quarters this is held to indicate a fresh buying movement on the part of the larger manufacturing organizations. Other opinion is that, while purchasing activity will be definitely progressive, labor shortages will limit expansion for the remainder of the year. Farm implement and automotive equipment inquiries are in the offing.

BOSTON

TWO leading dealers report August as the biggest month in machine tool orders in a number of years. September has started exceptionally well in both volume and inquiries, and there appears to be nothing to indicate that the pace will lessen during the month.

PHILADELPHIA

VIRTUALLY all manufacturing plants in this area are quite busy. A considerable number of them are on over-time schedules. Machine tool orders are in satisfactory volume, inquiries continue to be good and investigations of equipment earnest. Prominent distributers expect the condition to hold at least through the early fall.

DETROIT

MANUFACTURERS of special-purpose equipment are marking time so far as new orders are concerned. The main question is one of delivery and pressure from customers has increased, rather than decreased, during recent weeks. General lines are moving faster, and there is evidence that the automotive industry is getting ready for a mass rehabilitation program as soon as the new car programs are started. There is a feeling among some sellers that the industry is in for a buying splurge unprecedented since pre-depression days.

TOLEDO

MACHINE tool demand is active, new inquiries continue to develop rapidly and have the character of definite buying interest. Leading distributers in the area express opinion that the condition will prevail for some time to come. Delayed deliveries are effective in holding back orders on some pending proposals, while other methods of accomplishment are under investigation.

CHICAGO

ALLIS-CHALMERS MFG. CO. has issued a list for its plant addition at Springfield, Ill. Other farm implement manufacturers, now operating on curtailed production schedules, are less active in the machinery market, confining purchases to what may be termed incidental requirements. Dealers find immediate orders more difficult to close: The implement situation is one retarding factor, vacations are another and the Labor Day period has been a third.

In looking over inquiries, dealers feel that most of them are active and that orders will follow in the fall months despite expectation that deliveries will be pushed still farther in the future. Distributers are bearing the brunt of maker failures to keep delivery promises on some hard-fought orders of a few weeks ago. The second-hand market is quite thoroughly picked over in this area.

CINCINNATI

THE first effect of the vacation period was noticed in machine tool demand the past week, but business is above the anticipated early autumn level. No change is seen in the one-and-two-unit character of orders; inquiries are still for small numbers of machines. Distribution is highly satisfactory in that widely diversified interests are in the market for equipment. Plants are steadily pushed for more prompt shipments.

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FOR EVERY PURPOSE
Plain and Ornamental Perforations in a great variety of sizes and styles, made in any metal.
Excellence of product and low prices.
The Harrington & King PERFORATING CO.
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PERSONALS

(CONTINUED FROM PAGE 74)

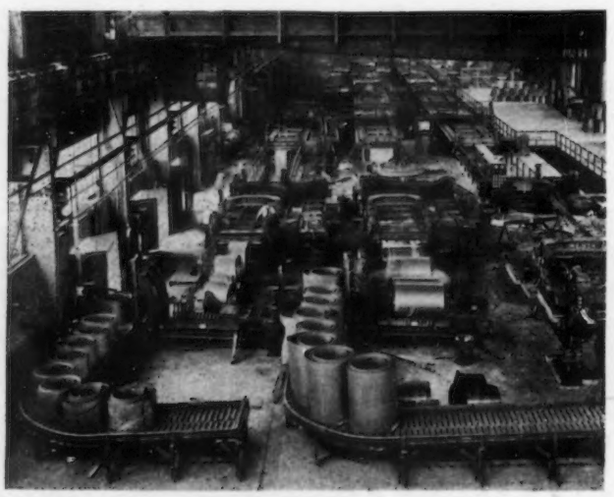
J. H. McELHINNEY, since 1929 general superintendent of the Lukens Steel Co., Coatesville, Pa., has resigned, effective Sept. 24, to become associated with another steel company. He will be succeeded as general superintendent by G. DONALD SPACKMAN, who has been president of Lukenweld, Inc., a division of the Lukens Steel Co. LESTER M. CURTISS, who was appointed superintendent of production a few months ago, will continue in charge of all production.

Mr. McElhinney was graduated from the University of Pittsburgh in 1909 and, after spending two years in power house construction work, entered the employ of the United Engineering & Construction Co. as a draftsman. In 1913 he joined the Youngstown Sheet & Tube Co. in the same capacity and was soon promoted to the post of inspector of construction. He later was made chief inspector and then assistant to chief engineer. After serving in the war he joined the Columbia Steel Co. as chief engineer and was later made assistant general manager. Three years later he entered the consulting engineering field at Youngstown. In 1926 he rejoined the United Engineering & Foundry Co. and the same year became assistant manager of production for the Lukens company.

Mr. Spackman, who was graduated from Swarthmore College in 1917, has been identified with the Lukens company since 1919, serving successively in the mechanical department, as fuel engineer, superintendent of the flanging department and assistant general superintendent prior to his election as president of Lukenweld, Inc., in May, 1930.

❖ ❖ ❖

E. J. ANGLIN has been elected vice-president in charge of operations of the Weirton Steel Co., Weirton, W. Va. He has been general superintendent since January, 1934, and has been identified with the company since 1916. J. S. WILLIAMSON, assistant general superintendent, has been made general superintendent.



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Much of the world's work is the overcoming of gravitation. This is especially true in handling materials. Mathews Conveyer Systems make practical use of gravity to obtain full transportation and continuous flow. The ingenuity displayed in many Mathews systems in converting intermittent into continuous flow is often surprising—and worth looking into if your plant is housed in more than one floor or building. Ask for the book "Problems Solved with Mathews Conveyer Systems."

MATHEWS CONVEYER COMPANY

San Francisco, Calif. ELLWOOD CITY, PENNA. Port Hope, Ont., Can.

..GREAT BRITAIN..

. . . Further expansion of demand for iron and steel expected.

° ° °

. . . Necessary to import semi-finished in excess of quota.

° ° °

. . . French mills may withdraw from export markets.

LONDON, Sept. 7 (*by Cable*).—British iron and steel markets have recovered completely from the holiday effects and further expansion of demand during the remainder of the year is anticipated.

Almost all pig iron produced up to the end of the year is required to meet contracts already placed. Home consumers at present are receiving adequate supplies, but, fearing a future shortage and further price advances, are offering contracts for the first quarter of 1937 which ironmasters, however, are declining.

Semi-finished steel supplies at present are adequate, though imports of Continental material in excess of quotas are still necessary. Home demand for finished steel is taxing producers' resources and the new plant is being hurriedly erected. Structural steel is being most heavily specified, but there is large miscellaneous demand in connection with shipbuilding, railway improvements, motor car activity and armaments. Export inquiry is brisker.

Good home and export demand for tin plates is reported and inquiry, especially for export, is broadening.

Continental iron and steel is active and works are assured of steady employment for some time ahead. French works are seriously handicapped by high production costs and may have to withdraw from export markets.

The Purchasing Agents Association of New York, affiliated with the National Association of Purchasing Agents, will hold its first fall meeting on Sept. 15 at the Builders' Exchange Club, 2 Park Avenue, New York. A large attendance is expected to hear an address by Harry Eaton, editor of Whaley Eaton Service, Washington, on "National and International Economic Problems."

Machinery Exports 1936-1937

(CONCLUDED FROM PAGE 55)

sion thus reached is confirmed by a study of the statistics of new financing. Where new funds available to corporations in the United States amounted to $48 million, $90 million and $87 million during the first five months of 1933, 1934 and 1935, for the first five months of 1936 they amounted to $310 million."

Obviously this is most significant but becomes even more so if the comparisons are made wider, if total, rather than monthly averages are considered and the returns are brought more nearly down to date. Giving the figures in thousands the record has been:

First six months 1929 (High)	$4,205,147
" " " 1933 (Low)	69,642
" " " 1935	100,569
" " " 1936	457,585

This is a monthly average of some $76 million—a rapid increase, to six times the volume of two years ago.

New Corporate Issues

	United States*	United Kingdom*	Germany#	Japan*	Switzerland*	Italy*	Netherlands*
1923	100	100	....	100	100	100	100
1924	114.9	132.1	100	67.7	245.1	152.2	352.7
1925	136.7	195.5	286.6	88.2	228.5	225.9	296.6
1926	142.5	208.4	606.7	111.9	159.2	142.6	295.0
1927	176.7	260.5	635.5	102.8	169.1	79.4	229.6
1928	202.8	324.2	638.3	98.3	204.7	135.5	707.7
1929	303.6	235.9	382.9	70.3	523.2	182.8	505.5
1930	170.1	188.4	526.2	30.8	458.8	154.8	321.7
1931	58.9	63.0	340.1	37.6	560.8	108.8	67.7
1932	12.3	124.0	82.5	29.7	212.9	91.6	47.6
1933	6.1	140.7	92.0	76.6	275.2	84.0	18.9
1934	6.8	157.9	121.4	90.0	182.7	89.1	79.2
1935	15.3	239.6	....	96.1	....	....	....
1936 (1st Q)	15.8	....	....	....	....	....	....

* Base: 1923 = 100. # Base: 1924 = 100.

So, in the domestic trade, after whistling for a wind all these long years, the machinery manufacturer feels the first faint stirrings of a gentle breeze. New capital is buying new equipment. Some may be purchased from reserves. (Certainly machinery builders have, for months enjoyed the prosperity of their own special eddies because of the war in Africa; preparedness in Europe; the special situations in the steel and automotive industries in this country and the like, but these are not typical. Many branches of the machinery industry still find business tragically depressed.)

An adequate picture of the situation abroad can not be presented because of the difficulty of reducing it to a statistical statement. But the following table from the Chase Economic Bulletin of May 12, 1936, is suggestive.

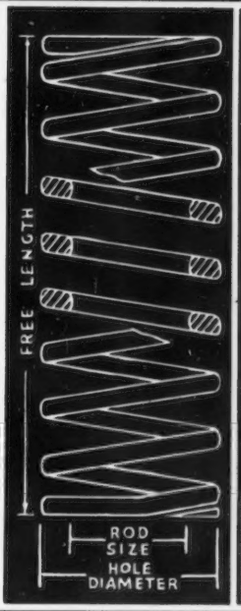
Obviously, such returns are not strictly comparable, because of the varying circumstances and statistical methods of the several countries. Also it may not be strictly good method to use 1923 as a base of 100 in every instance. For example, the United Kingdom still suffered from the post-war depression and an over valued currency. But after allowance for such considerations, one still concludes:

1—Financial conditions are improving in this country but are improving much more rapidly abroad.

2—Machinery sales will improve similarly with exports disproportionately large.

Remembering this relationship between the capital market and machinery sales, it is interesting to examine the most recent detailed

Specialists in . . .
DIE SPRINGS



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There are 102 stock sizes on the way to you as soon as your order is received—Parcel Post or Express we always pay the bill. You never used better die springs—try us.

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OFFICE AND FACTORY: LOGANSPORT, INDIANA

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—One where synchronization, remote control, operating safety and dependability are demanded?

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There is a size for every problem. Let us tell you what we can do.

Dings High Intensity MAGNETIC CLUTCHES

DINGS MAGNETIC SEPARATOR CO.
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Since 1899 Dings engineers have been building magnetic equipment. Here is experience that no other manufacturers of this type of equipment can offer. Such experience has a real dollars and cents value to you.

statistics as shown in the accompanying tabulation.

Certain branches of the machinery industry already enjoy a larger export volume than they experienced in 1929. This applies to certain types of machine tools and reflects the situation in Europe and Africa. It also applies to cotton gins and presses which are in demand because of the increased cotton production of Brazil, Argentina, etc. Oppositely, the exports of certain other lines are depressed because construction abroad awaits activity in the capital markets. The lines thus restricted include locomotives, concrete mixers, power shovels, water tube boilers, blowers and ventilators. However, as suggested by the two bank items mentioned above, it may be that the tide has turned and new capital will become increasingly available for new corporate activities which implies larger purchases of machinery. Better times for these lines may be at hand. Other lines are still depressed because the standard of living is held down by the poor economic position of the people in these several countries. Such lines include cotton looms, circular hosiery knitting machines, laundry equipment, etc. However, an improved capital market will stimulate the activities that will revive living standards thus expanding these exports as well as the others mentioned previously.

In thinking of the depression and recovery, we are apt to concentrate on the domestic situation; to attach too much importance to some pet piece of legislation. In cold fact this has been a world depression and recovery seems to be beyond the reach of any parliament. But now that we can see signs of a revival of new capital issues in the money markets of the world we may expect to see exports of industrial machinery stimulated. The facts presented above suggest that exactly those changes impend.

★

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May We Serve You?

THE BISSETT STEEL COMPANY, Cleveland, O.

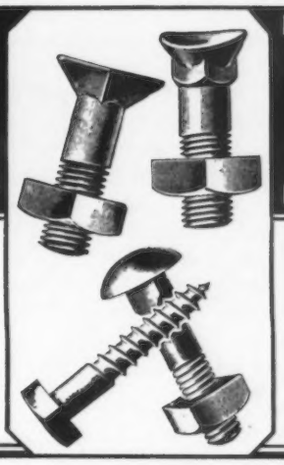
The Tubing Specialists

Scrap Classifications Revised, Printed

THE Division of Simplified Practice of the National Bureau of Standards has announced that simplified practice recommendation R58-36, classification of iron and steel scrap, is now available in printed form. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, for 5c. each.

This simplified practice recommendation, which originally became effective July 1, 1926, specifies classes of scrap for blast, basic open-hearth, acid open-hearth, and electric furnaces for gray iron foundry practice, Bessemer converters, and for miscellaneous scrap. A contract form for purchase of scrap is also included. The revision covers certain additions and eliminations to meet current needs.

CLARK BOLTS



Dependable

Quality, Accuracy, Uniformity, Service and Deliveries that Make Business Better

Write for Catalog

CLARK BROS BOLT CO.

Clark Street Milldale, Conn.

Flexibility in Press Layout

(CONTINUED FROM PAGE 41)

of the building, and over these the presses are placed. On the side of each pit are structural steel rails or tables resting on concrete piers placed on 10 ft. centers. The piers transmit the weight load directly to the floor of the pit. Movable girders are placed across these rails and on them the press shoes either rest directly or through another set of girders at right angles, if the shoes are at the side. The size of the press determines this design of shoes. This second set of cross girders can be pulled either in or out to accommodate the width of the press, and for the smaller presses considerable latitude is provided as to sideways location. The pit rails are 24 ft. center to center and while almost any center distance between presses is possible, the usual range for line operations is 20 to 26 ft. Often it is desirable to have an arrangement where the middle press of three is at right angles to the others to facilitate handling of stampings between presses. The new press foundations make this possible.

The photograph shows a simple wood model of this layout constructed as an aid in demonstrating

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BUILD-UP of steel girders to form crib arrangement for flexible press layout over huge pits.

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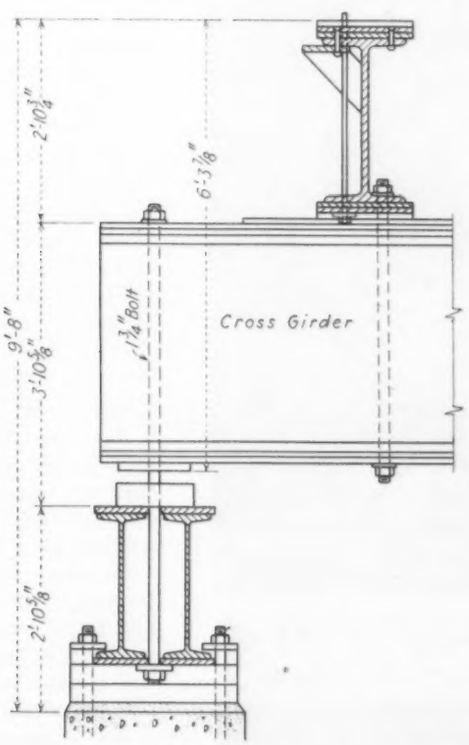

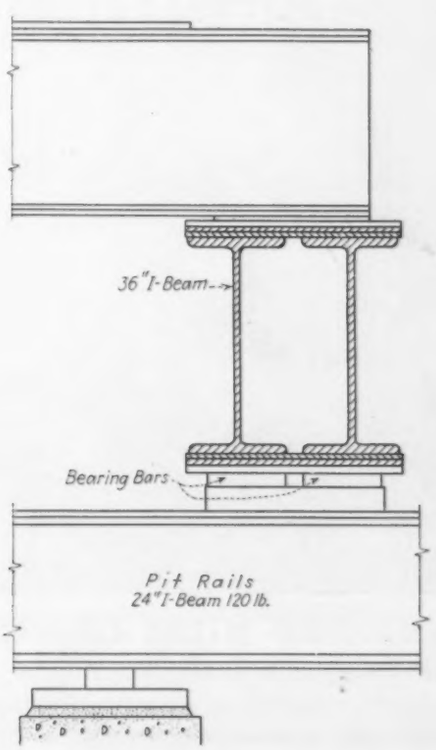

the features available. Another photograph shows an actual view in one of the pits during the erection of one of the 500-ton presses. Structural details are shown in the drawings.

The concrete pillars are capped with steel plates 28 x 26 x 3 in. with a narrower plate 28 x 8 in. by 3½ in. thick transmitting the weight load so as to assure center distribution of load on the columns. Each side rail is composed of two 24-in. 120-lb. I-beams with 8 x 1⅛ in. plates riveted top and bottom of each beam. Space 3 in. wide is left between the beams to permit shifting of the tie bolts for the cross girders. At 5-ft. intervals there are I-beam spacers riveted to the web members. Anchorage of the I-beams to the columns is through two 1¾ in. bolts passing through lugs welded to the I-beams. The lugs are partially formed from 7-in. channels as shown in the detail.

The cross girders are each composed of a pair of 36-in. wide-flange I-beams of heaviest section

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DETAIL of lug welded to I-beam to form seat for tie rod nut.

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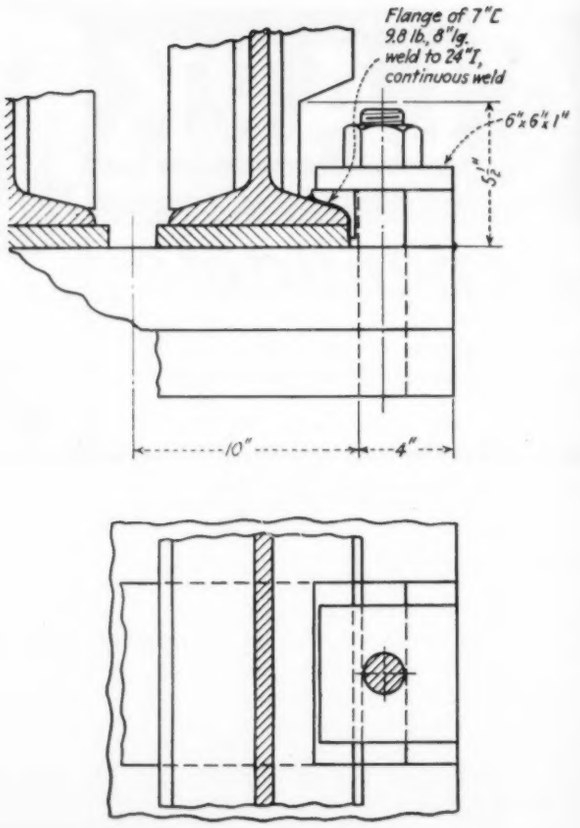

available, 26 ft. long. Two plates 36 x 1 in. in section are riveted top and bottom, and in addition there are bed plates on top attached with countersunk rivets. These plates are carefully planed in place. The I-beams themselves were subjected to straightening after rolling at the mill. In fact, when a pair of cross girders are in place they must line up (by surveying instrument) within 0.010 in. at any point in the plane.

These cross girders are anchored to the side rails through 1¾ in. tie bolts. The weight is carried through bearing bars approximately 2-in. square, resting in turn on a 4-in. plate which can be slid along the rails. The purpose of the narrow bearing bars is to assure the load being distributed equally to both I-beams forming the pit rails.

To complete the crib work of girders, there is another pair setting on top of the cross girders and parallel to the pit rails. These are for carrying the lighter presses with shoes at the ends and are formed of single 27¼ in. I-beams reinforced with two ⅞-in. plates top and bottom and with planed bed plates on top. These girders can be pulled either in or out to accommodate the width of the press

SHEPARD NILES

DIRECT WORM DRIVE

Electric Hoists

1/4 TO 6 TONS CAPACITY

CLOSE HEADROOM, AUTOMATIC LUBRICATION, ROPE OR PUSH BUTTON CONTROL, ANTI-FRICTION BEARINGS

WRITE FOR BULLETIN

SHEPARD NILES CRANE & HOIST CORP.

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MOST COMPREHENSIVE LINE OF CRANES & HOISTS

and its location over the pit. Altogether, there is 9 ft. 8 in. of steel girders piled one on top of the other between the top of the concrete pedestals and the floor line.

In the space between presses a false frame work is built up so that lighter floor beams can be used. On top of these beams removable floor sections are laid so that the floor can readily be pulled up to facilitate movement of machinery from under the press when changes are being made. At the same time, by merely putting up guard rails, it is possible to continue operations in the adjoining press since the amount of floor to be pulled up is optional. These floor sections are made of dovetailed laminated oak blocks nested within an angle iron frame. They are roughly 3 ft. square and can be lifted by hand. Such a flooring is resilient enough to absorb the impact of dies when they are dropped and the worn sections in front of a press are easily replaced.

At first sight the use of such a tremendous steel chess board seems unnecessarily expensive—runs into hundreds of thousands of dollars in a plant of this size. Yet Fisher Body engineers believe the installation will pay for itself over a relatively few years time in savings in changing press layout and also in direct cost savings made by rearranging press lines to suit the job. In most plants where permanent press foundations are used, the tremendous cost involved would never justify the change. At the Grand Rapids Stamping Co. flexibility is inherent and the most will be made of this feature in future years.

Evaluating Shop Jobs

(CONCLUDED FROM PAGE 45)

signed points in this manner, the desired form of the wage curve has been definitely transmitted to the job rankings, and in a manner that immediately becomes measurable.

It is now possible to secure a figure representing the mutual relationship among jobs by totaling the point values selected under each factor. The total point value of a wide range of jobs should be plotted on regular ordinate paper against existing wage maximums for these jobs. A straight line "Curve of Least Squares" through these points will determine the maximum dollar value per point with reference to general wage levels. This will be a straight line on regular ordinate paper, because the geometric principles of the wage structure have already been embodied in the point allowances. Moreover, the dollar value of a point will be constant for all jobs so long as general wage levels remain unchanged.

Here, therefore, we have an analytical method of quite accurately rating jobs, which to describe may appear dangerously complicated, but to apply becomes relatively simple. In a subsequent article, the actual application will be discussed more at length.

THESE FIVE FUNDAMENTALS

were built into the above display to convey the sales message of United States Steel.

- NAME—dominates the display—accomplishes name registry.
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- TERRITORY AND DISTRIBUTION—showing their many subsidiaries and wide field serviced.
- SALES STORY—presented in a compelling, graphic manner.
- EYE APPEAL—combines color, light and motion to stop traffic and complete the selling job.

We have designed and built many successful exhibits, both large and small. May we consult with you on *your* next convention display? Without obligation, of course!

GARDNER DISPLAYS

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PITTSBURGH . . . 477 MELWOOD STREET

PLANT EXPANSION AND EQUIPMENT BUYING

. . . Southern Kraft Corp., New York, has plans for a new mill in the South, to cost more than $1,000,000 with equipment.

o o o

. . . Precision Spring Corp., Detroit, has let contract for a new plant to cost $100,000 complete.

o o o

. . . Utah-Idaho Sugar Co., Salt Lake City, plans an expenditure of $750,000 for a new mill near Toppenish, Wash.

NORTH ATLANTIC

Southern Kraft Corp., 220 East Forty-second Street, New York, a subsidiary of International Paper Co., same address, has plans for new pulp and paper mill in South, with power house, machine shop and other mechanical departments. Cost over $1,000,000 with machinery. Company is now operating similar mills at Panama City, Fla., and Mobile, Ala.

New York Edison Co., 4 Irving Place. New York, has filed plans for extensions and improvements in electric power plant on First Avenue, Thirty-ninth to Fortieth Streets, including new equipment, new steel stack and other construction. Cost about $600,000 with equipment. Ernest M. Van Norden is company engineer.

National Pneumatic Co., 420 Lexington Avenue, New York, manufacturer of pneumatic equipment and devices for railroads, motor buses, etc., has let general contract to Wigton-Abbott Corp., 143 Liberty Street, for one-story and basement addition to plant at Rahway, N. J. Cost over $85,000 with equipment.

Smith & Gregory of New York, Inc., 426 West Fifty-fifth Street, New York, automotive power brakes and kindred equipment, has leased one-story building, 12,000 sq. ft. floor space, now being erected at 529-33 West Thirty-fifth Street, for service, repair and distributing plant.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until Sept. 17 for two lighted buoy bodies of riveted steel plate (Proposal 52102).

Sheffield Farms Co., Inc., 524 West Fifty-seventh Street, New York, has plans for three-story and basement electric-operated milk pasteurizing, storage and distributing plant at 806-830 Eleventh Avenue, 200 x 500 ft. Cost close to $900,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 15 for six automatic rivet passers (Schedule 8729), one motor-driven vertical boring mill (Schedule 8736); until Sept. 22, cable for marine use (Schedule 8740) for Brooklyn Navy Yard.

Quartermaster, United States Military Academy, West Point, N. Y., asks bids until Sept. 14 for one motor-generator set, one automatic magnetic reduced voltage starter and synchronous motor control panel, one circuit breaker, one knife switch, three lightning arresters and three disconnecting switches (Circular 53).

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Sept. 28 for 900,000 ft. of wire, 10,000 ft. of cable, 1000 ft. of switchboard cable and 19 reels (Circular 37).

Acme Steel Drum Co., 368 Verona Avenue, Newark, steel barrels, drums, etc., has purchased former plant of Newark Tube Works, 560 Ferry Street, on two-acre tract, and will remodel for new plant. Present works will be removed to new location later and capacity tripled.

Okonite Co., Canal Street, Passaic, N. J., manufacturer of insulated wire and cables, has let general contract to Curtis-Pethic Co., Wilkes-Barre, Pa., for one-story addition, 75 x 105 ft., to branch plant at Wilkes-Barre. Cost over $60,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Sept. 30 for one multiple-spindle automatic screw machine (Circular 87), 406 fin assemblies for 2000-lb. demolition bombs (Circular 89).

Colgate-Palmolive-Peet Co., 105 Hudson Street, Jersey City, N. J., manufacturer of soaps, etc., has plans for five-story addition to branch plant at Jeffersonville, Ind., for which superstructure will begin. Cost about $200,000 with equipment.

Lanston Monotype Machine Co., Twenty-fourth and Locust Streets, Philadelphia, manufacturer of type-setting machines and parts, has let general contract to United Engineers & Constructors, Inc., 1401 Arch Street, for one-story addition to main factory and improvements in storage and distributing building adjoining. Cost close to $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 22 for 300 aircraft oxygen regulators (Schedule 8739) for Philadelphia Navy Yard; eight pipe bends, corrugated and creased for main steam line, complete with flanges, etc. (Schedule 8730), for Philadelphia and Brooklyn yards.

E. I. duPont de Nemours & Co., Inc., Philadelphia, chemicals, paints, etc., has let general contract to Turner Construction Co., Architects' Building, for three-story and basement addition, 107 x 139 ft. Cost about $175,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Sept. 15 for aluminum alloy castings (Circular 63), 40,000 lb. cartridge brass cups (Circular 72).

BUFFALO DISTRICT

Simonds Saw & Steel Co., Lockport, N. Y., has asked bids on general contract for one-story addition, primarily for foundry expansion. Cost over $45,000 with equipment. Company headquarters are at Fitchburg, Mass.

Olympic Motor Car, Inc., Syracuse, N. Y., recently organized, has acquired local plant and property of H. H. Franklin Mfg. Co., South Geddes Street, and will modernize for production of new model low-priced automobile, including parts manufacture and assembling.

Jamestown Metal Equipment Co., Allen Street, Jamestown, N. Y., manufacturer of metal office furniture and fixtures, has let general contract to J. M. Benzinger, Gokey Building, for two-story and basement addition, 75 x 100 ft. Cost over $50,000 with equipment.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 15 for 21,880 ft. galvanized plow steel wire rope (Schedule 8755) for Boston Navy Yard; until Sept. 22, admiralty metal condenser tubes and copper-nickel alloy condenser tubes (Schedule 8747) for Boston, Norfolk and Mare Island yards.

Connecticut Malleable Castings Co., East and Bridge Streets, New Haven, Conn., has let general contract to Frank P. Sullivan, Inc., 127 Prospect Road, East Haven, for one-story foundry addition, 56 x 200 ft. Cost over $45,000 with equipment. Leo F. Caproni, New Haven, is architect.

Commanding Officer, Ordnance Department Springfield Armory, Springfield, Mass., asks bids until Sept. 14 for one power pump (Circular 37); until Sept. 15, 10 cutter adapters (Circular 38).

Connecticut Light & Power Co., Hartford, plans expansion and improvements, including installation of 25,000-kva. turbo-generator unit and accessory equipment at Montville, Conn., power plant, transmission and distributing lines, power substations and other work. Financing in gross amount of $14,500,000 has been arranged, part of fund to be used for purpose noted.

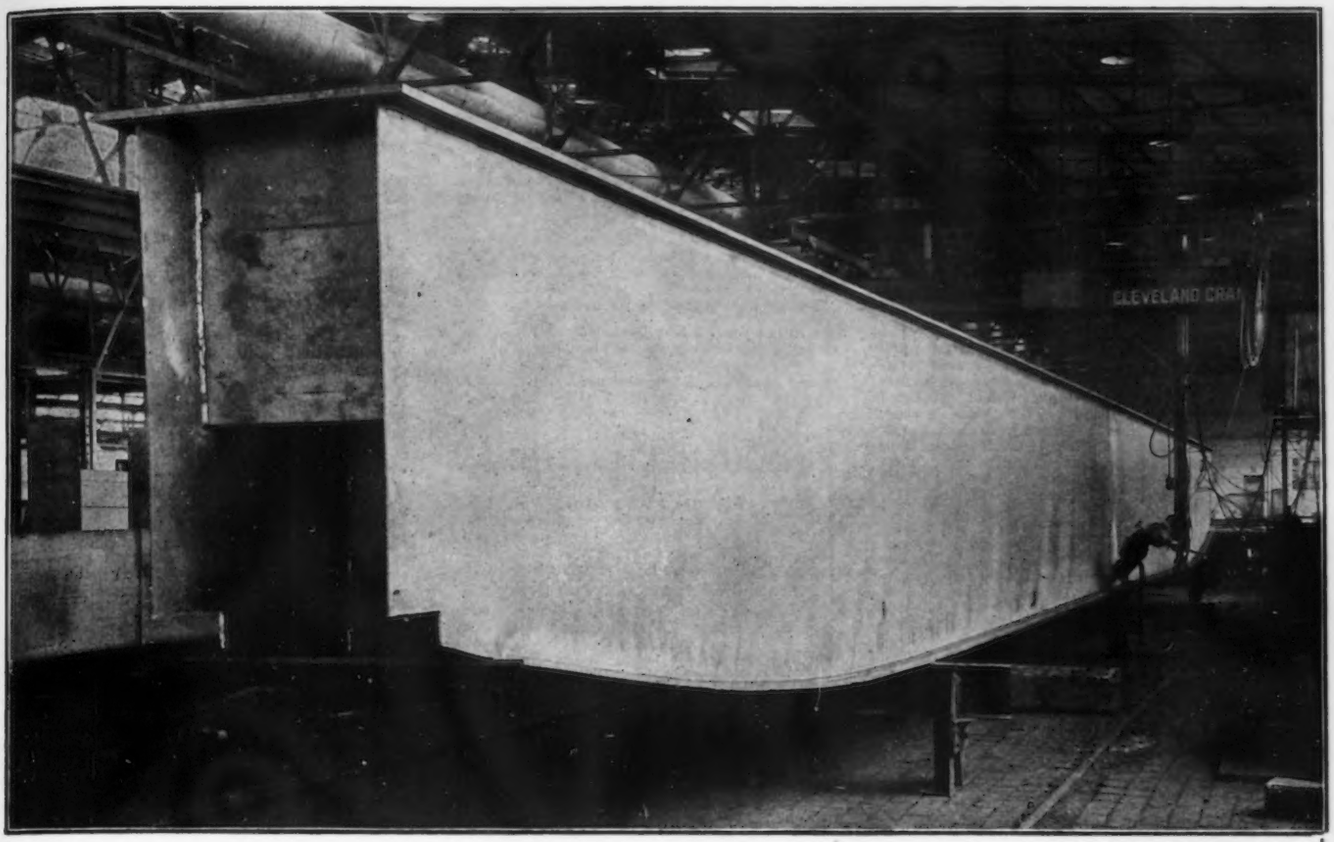
Public Works Department, Administration Building, Springfield, Mass., plans one-story municipal repair and equipment shop on State Street, including central station unit for fire alarm system. Cost about $200,000 with equipment. Financing will be arranged through Federal aid.

Van Norman Machine Tool Co., Wilbraham Avenue, Springfield, Mass., has plans for an addition to its plant, details of which will be given out shortly.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Sept. 24 for tools and automobile parts, including grinders, drills, wrenches, jacks, etc.—69 items in all (Circular 12).

National Advisory Committee for Aeronautics, Langley Field, Va., asks bids until Sept. 21 for one-story addition to mechanical shop, 30 x 100 ft., at local field.



NINETY-ONE FOOT GIRDER

Weight 32,500 lbs.—5 Ft. 5 Inch Span

Automatically welded with

UNAMATIC SHIELDED ARC PROCESS

THIS girder is one of four duplicate girders built by the Cleveland Crane & Engineering Company, Wickliffe, Ohio, made with continuous ninety-one foot fillet welds. It is our belief that this is the first box type girder ever welded automatically with shielded arc process.

These welds were welded by the Unamatic, a fully automatic process producing shielded arc weld metal results.

The welds are full 7/16" fillets, made in one single pass, with 1/4" wire at a speed of 32 feet per hour. Not only high speed but a shielded arc weld metal with its resulting high tensile and ductility is obtained.

The Unamatic Process uses full sized coils of wire, direct current contact to the wire, shielding by forming a suitable fluxed tape around the wire directly above the arc.

Adaptable for A.C. or D.C. welding current.

Write for full details regarding application for your production welding.

UNA Welding, Inc.

Department B

CLEVELAND, OHIO

Manufacturers of Una Welding Rods and Automatic Equipment

PLANTS AT CLEVELAND, OHIO, MONESSEN, PA. AND HOUSTON, TEXAS

City Council, Winchester, Va., plans installation of pumping machinery and accessories, pipe lines and other waterworks equipment for expansion in water system, including development of new source of supply. Special election has been called Sept. 29 to approve bonds for $500,000 for project.

Quartermaster Depot, Washington, asks bids until Sept. 24 for one diesel type engine-generator set, complete with auxiliary equipment (Circular 43).

Purchasing Officer, Department of Interior, Washington, asks bids until Sept. 14 for one portable electric arc welder for Almira, Wash. (Proposal 1769).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 15 for one 1100-lb. single-frame forging hammer, steam or air-driven (Schedule 8752) for White Plains Naval Station; steel valves (Schedule 8735), one motor-driven sheet metal forming and flanging machine (Schedule 8640) for Eastern and Western Navy yards; exhaust fans, blast gates and dust collector (Schedule 8734) for Quantico, Va., yard; until Sept. 18, 59,000 ft. of flexible steel cable (Schedule 6585) for Eastern and Western, and Philadelphia yards; spare parts for airplanes (Schedule 900-9949); until Sept. 25, spare parts for airplanes (Schedule 900-9955) for Sewall's Point, Va., Naval Station.

SOUTHWEST

International Harvester Co., 606 South Michigan Avenue, Chicago, has let general contract to Beaty & Schwartz, 520 N.W. Twentieth Street, Oklahoma City, Okla., for one-story factory branch, storage and distributing plant at Oklahoma City, 100 x 140 ft. Cost close to $60,000 with equipment.

Anheuser-Busch, Inc., 721 Pestalozzi Street, St. Louis, has let contract to Stupp Brothers Bridge & Iron Co., 3800 Weber Road, for structural steel for six-story addition to brewery, 30 x 100 ft. Cost over $125,000 with equipment.

Board of Public Works, Poplar Bluff, Mo., asks bids until Sept. 16 for one 400-hp. cross-drum watertube boiler with accessories, spreader-type coal stoker, feedwater heater, air preheater, combustion control equipment, etc., for municipal electric power plant.

Board of Education, 410 South Cincinnati Street, Tulsa, Okla., H. W. Gowans, business manager, plans manual training department in new three-story and basement high school in East Side district, for which bids will be asked soon on general contract. Cost about $600,000. Leon B. Senter, Philtower Building, and Joseph R. Koberling, 569 South Peoria Street, are associated architects; A. M. Atkinson, Thompson Building, is supervising architect.

Rio Grande Valley Citrus Growers' Association, Weslaco, Tex., has plans for one-story citrus fruit processing and packing plant, 100 x 200 ft. Cost close to $50,000 with machinery, including conveying, loading and other equipment.

H. W. Carver, Waco, Tex., and associates have acquired plant of Industrial Cotton Oil Mill and will remodel. Cost over $40,000 with machinery. New company, capitalized at $100,000 is being organized to operate plant.

Dixon Packing Co., Houston, Tex., food packer, has acquired property at Calhoun Street and Houston Belt Terminal for new one-story plant. Cost close to $45,000 with equipment.

SOUTH CENTRAL

James E. Pepper & Co., Lexington, Ky., distiller, unit of Schenley Distillers Corp., New York, has let general contract to Frank Messer & Sons, Inc., 2515 Burnet Avenue, Cincinnati, for seven-story addition for storage and distribution. Cost over $200,000 with equipment. Carl J. Kiefer, Inc., Schmidt Building, Cincinnati, is consulting engineer.

Superintendent of Lighthouses, New Orleans, asks bids (no closing date stated) for two 10-kw. diesel engine-driven generator sets and two 35-hp. diesel engine-driven air compressor sets for Heald Bank Lightship No. 81.

Fayette-Utica Rural Electrification Association, Fayette, Miss., now being chartered, care of Mississippi State Electrification Authority, Jackson, Miss., Evon Ford, chairman, plans transmission and distributing lines in Fayette and Utica areas, about 125 miles, for rural electrification. Cost about $150,000. Financing is being arranged through Federal aid.

Southern Cotton Oil Co., Canal Bank Building, New Orleans, has plans for new mill on site recently secured at Harlingen, Tex., with power house and machine shop. Cost about $140,000 with equipment.

United States Engineer Office, First District, New Orleans, asks bids until Oct. 15 for one all-welded steel, self-propelled, diesel engine-electric-operated, mechanical hyacinth destruction plant (Circular 51).

SOUTH ATLANTIC

Taylor Mfg. Co., Inc., Clearwater, Fla., W. C. Taylor, secretary and general manager, recently organized, has leased property at 18 South Garden Street, for manufacture of air-conditioning and air-purification equipment.

Purchasing and Contracting Office, Quartermaster Office, Fourth Corps Area, Post Office Building, Atlanta, Ga., asks bids until Sept. 15 for machine bolts and nuts, washers, spring hinges and other hardware products (Circular 4).

P. Phillips Co., Inc., 70 West Robinson Avenue, Orlando, Fla., fruit packer, has approved plans for one-story citrus fruit packing plant, 160 x 180 ft., at Fairyvilla, near Orlando, to replace unit recently destroyed by fire. Cost close to $100,000, of which about $50,000 will be expended for conveying, loading and other equipment, also steam generator unit.

WESTERN PA. DIST.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has approved plans for one-story addition to copper mill in Turtle Creek district, 100 x 120 ft. Cost over $60,000 with equipment. Work will also begin soon on new steam power house at main plant, 60 x 80 ft.; installation to include one 1600-hp. and two 1200-hp. boilers and auxiliary equipment.

United States Engineer Office, Pittsburgh, asks bids until Sept. 25 for 13 fabricated steel lift gates, 14 sets of gate-hoisting machinery, service bridge with trolley tracks for operation of derrick, electric power and lighting distributing systems, electrical control equipment, etc., for Emsworth lock and dam, Ohio River (Circular 43).

Penn Glenn Oil Works, First Street, Leechburg, Pa., manufacturer of refined oil products, plans new one and two-story plant. Cost over $50,000 with equipment.

OHIO AND INDIANA

Lectrolite Corp., Defiance, Ohio, manufacturer of metal stampings, automobile accessories, etc., has let general contract to Baker & Shindler Contracting Co., Defiance, for two one-story additions. Cost about $35,000 with equipment. Plans are under way for another one-story extension.

Art Metal Co., 1800 East Thirty-eighth Street, Cleveland, manufacturer of indirect lighting fixtures and other metal specialties, has leased a floor in former plant of American Multigraph Co. for expansion, providing total of about 40,000 sq. ft. floor space for production.

Murray Ohio Mfg. Co., 1115 East 152nd Street, Cleveland, manufacturer of stamped metal goods, steel toys, etc., has let general contract to Lundoff-Bicknell Co., Terminal Tower Building, for two-story addition, 85 x 110 ft. Cost close to $90,000 with equipment. George S. Rider Co., Marshall Building, is architect.

Columbia Electric Mfg. Co., 4519 Hamilton Avenue, Cleveland, manufacturer of electroplating generator units, electric alternators and kindred equipment, will take bids soon for one-story addition, 60 x 250 ft. Cost close to $100,000 with equipment. Christian, Schwarzenberg & Gaede, 1836 Euclid Avenue, are architects.

Automotive Air Conditioning Laboratories, Inc., Cleveland, recently organized, care of Hoyt P. Downing, Hippodrome Building, attorney and representative, has arranged for acquisition of local plant for production of lately patented air-conditioning equipment for automobiles, including parts manufacture and assembling.

Contracting Officer, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Sept. 14 for 51 sling assembly-bomb hoists for 300, 600, 1100, 2000 and 4000-lb. bombs (Circular 121), 230 guide parachute flare external rack cables, rack control cable casing supports, plates, etc. (Circular 140); until Sept. 15, one vacuum pump (Circular 107), 2500 screw drivers (Circular 135); until Sept. 16, 63 sets steel wheels (Circular 127); until Sept. 18, 812 flaring tools (Circular 139); until Sept. 21, two precision bench lathes and three bench grinders, motor-driven (Circular 128).

Board of Public Works, Valparaiso, Ind., plans extensions and improvements in municipal waterworks, including electrification of pumping plant and additional equipment, elevated steel storage tank and tower, extensions in filter plant machinery and other equipment. Cost about $168,000. Charles Brossman, Chamber of Commerce Building, Indianapolis, is consulting engineer.

MICHIGAN DISTRICT

Precision Spring Corp., 5900 Federal Street, Detroit, manufacturer of steel springs, etc., has let general contract to Austin Co. for one-story plant, 150 x 330 ft. Cost over $100,000 with equipment.

City Council, Flint, Mich., is arranging financing through Federal aid in amount of $1,800,000 for new municipal electric power plant and distributing lines. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Mueller Brass Co., Port Huron, Mich., has let general contract to W. E. Wood Co., 4649 Humboldt Street, Detroit, for one-story addition and alterations and improvements in present plant. Cost close to $65,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects and engineers.

Kelvinator Corp., 14250 Plymouth Street, Detroit, manufacturer of electric refrigerators, etc., and Dexter Co., Fairfield, Iowa, manufacturer of electric washing machines, acting jointly, have acquired plant of Buckeye Jack Mfg. Co., Alliance, Ohio, and will remodel for manufacture of electric washing machine units, including parts production and assembling. Tubs for new machines will be produced by Alliance Porcelain Products Co., operating an enameling plant on adjoining site. A company, jointly owned by two first mentioned corporations, will be formed to operate Alliance plant, headed by R. D. Hunt and V. E. Dunn.

Luce Mfg. Co., Lansing, Mich., manufacturer of special bodies for motor trucks, has leased main floor in former plant of Auto Body Co., North Lansing, about 45,000 sq. ft. floor space.

MIDDLE WEST

Goodman Mfg. Co., 4834 South Halsted Street, Chicago, manufacturer of coal-mining and other heavy machinery, electric haulage locomotives, etc., has asked bids on general contract for one-story addition and improvements in present plant. Cost over $45,000 with equipment. Mundie, Jensen, Bourke & Havens, 39 South LaSalle Street, are architects.

International Harvester Co., 606 South Michigan Avenue, Chicago, has filed plans for one-story addition to plant at 2600 West Thirty-first Street, 88 x 100 ft., primarily for storage and distribution. Cost about $40,000 with equipment. O. A. Krueger is company architect.

Briskin Mfg. Co., 4243 West Ogden Street, Chicago, manufacturer of sheet metal products, has let general contract to

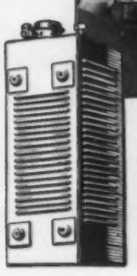
(CONTINUED ON PAGE 132)

Industry has found a GIANT

With markets clamoring for more manufactured output, many industries are raising the over-all capacity of existing facilities by more extensive use of that modern giant—the battery industrial truck.

These trucks keep material on the move without congestion—feed machines with work and take it away as fast as machines and men can operate. They are truly giants ...can handle burdens up to 75 tons...load and unload themselves, thus dodging the work of needless rehandling. But they have a vulnerable point...

The power unit. Therefore industry tends more and more to standardize on Edison Steel-Alkaline Batteries in the power box. They are not subject to unexpected failure. Their performance is predictable. They do not give off gas fumes, require repairs, sulphate or break. Only the Edison is built of steel; only the Edison uses non-corrosive alkaline electrolyte; all other batteries made in this country are the lead-acid types. Edisons live 2 to 5 times as long; cost least per year; keep production flowing. Industry uses more Edison Batteries than all other makes combined.



Just out! An authoritative data book on modern materials handling. Your copy is ready. Send for it now!

EDISON storage BATTERY

DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, N. J.

CASE STUDY No. 132

PACEMAKER FOR PRODUCTION

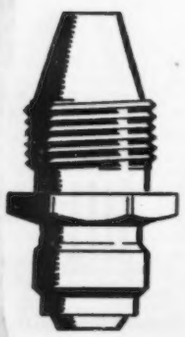
HERE'S THE RECORD

PRODUCTION ON OLD MACHINES

PRODUCTION ON NATIONAL ACME MACHINES

Extra Savings

Three secondary operations eliminated on new machines
Maintenance costs slashed



PRODUCTION ON OLD MACHINES

PRODUCTION ON NATIONAL ACME MACHINES

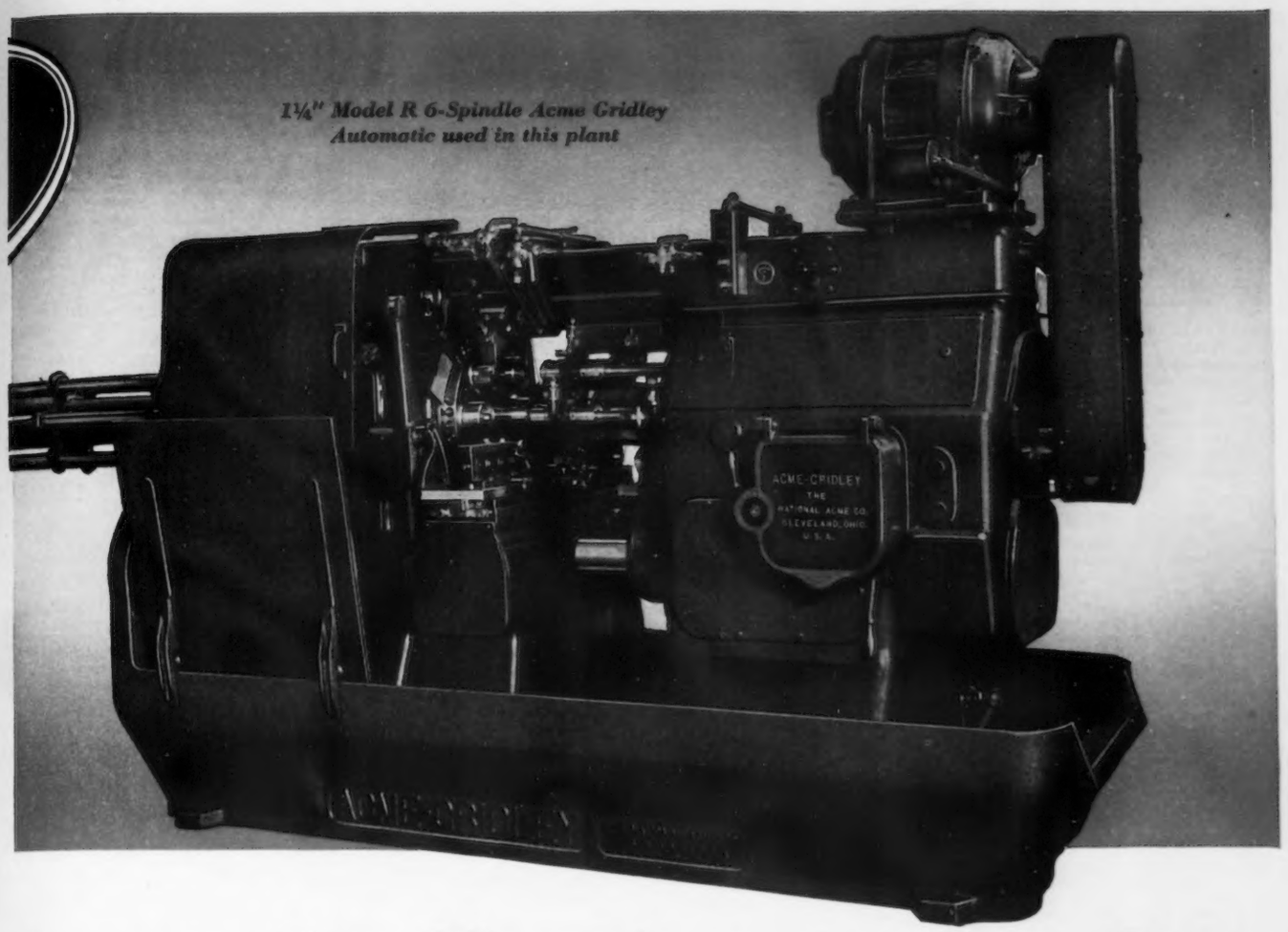
Extra Savings

Down time reduced ⅓ with new machines
Work is held to closer limits
Maintenance costs materially reduced

⅞" Model R 4-Spindle Acme Gridley Automatics in use in this plant

Automatic Screw Machines
Dies and Taps
Positive Centrifuges
The Chronolog
Contract Manufacturing

NATIONAL



1¼" Model R 6-Spindle Acme Gridley Automatic used in this plant

Automotive Manufacturer Cuts Costs with New Screw Machines

TOUGH JOBS are easy when they are handled on National Acme Gridley Automatics. Take for example the automotive parts shown on the opposite page. With old machines, three secondary operations were necessary on the slotted ball stud. With these new machines there are no secondary operations—and what's more, production is increased 37%.

On the speedometer drive shaft sleeve, close tolerances could not be held. Now they easily meet specifications. And production is stepped up 20%.

Model R Automatics are pacemakers for the production line. At the same time they constantly provide a finer finish and a higher degree of accuracy. Their versatility eliminates many secondary operations.

Not a few plants report that their machines have paid for themselves in less than a year. Our engineers will be glad to study your equipment, make recommendations, estimate the possible savings.

The National Acme Company, *Cleveland, Ohio*

NAMCO

REG. U.S. PAT. OFF.

FOR SALE: PRODUCTION

We offer profit-minded executives not just screw machines—but *increased production*—lower production costs. Our machines must pay their own way, and show a profit besides. Many of America's largest manufacturers will tell you that National Acme Gridley Automatics are doing just that in their plants.

ACME
GRIDLEY AUTOMATICS

(CONCLUDED FROM PAGE 126)

Rudenberg & Cohen, 1533 South Kedvale Avenue, for one-story addition. Cost about $35,000 with equipment. Eisenberg & Co., 14 West Washington Street, are architects.

Public Buildings Branch, Treasury Department, Washington, asks bids until Sept. 14 for one 200-gal.-per-min. centrifugal pumping unit with accessories for Des Moines, Iowa (Proposal 222-552-A).

Common Council, Onawa, Iowa, asks bids until Sept. 24 for two 625-hp. diesel engine-generator units with accessories, switchboard, instruments, electric distributing lines, etc., for municipal electric power plant. Cost about $130,000. Buell & Winter Engineering Co., Insurance Exchange Building, is consulting engineer.

Fargo Foundry Co., 92 Northern Pacific Avenue, Fargo, N. D., manufacturer of iron castings, will take bids soon for modernization of present plant, including second-story addition, 30 x 75 ft., and adjoining one-story extension, 50 x 200 ft., latter primarily for storage and distribution. Cost over $45,000 with equipment.

Rath Packing Co., Sycamore and Elm Streets, Waterloo, Iowa, meat packer, has let general contract to J. E. Currie & Jens Olesen & Sons Construction Co., 1500 Sycamore Street, for one-story and basement addition, 138 x 216 ft., with foundations for five additional stories later, in part for storage and distribution. Initial unit will cost close to $100,000, and complete structure about $350,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Trane Co., La Crosse, Wis., manufacturer of heating and air-conditioning equipment and supplies, contemplates expenditure of $75,000 to $100,000 for plant enlargement, in addition to extensions in recent months.

Allis-Chalmers Mfg. Co., Milwaukee, has placed general contract with Meredith Bros. Co., 121 East Washington Street, for new tractor engineering office and laboratory at main works in West Allis, to cost $100,000 with equipment. It will be three stories, first floor 60 x 200 ft., second and third, 60 x 100 ft. H. C. Merritt is general manager of tractor division.

Columbus Rural Electrical Co-operative, Columbus, Wis., has placed contracts with Donovan Construction Co., St. Paul, Minn., for electrical distribution system in Dane, Dodge and Columbia counties as REA project at $172,701. E. B. Wayte, State Capitol, Madison, Wis., is district engineer.

◀ PACIFIC COAST ▶

Bethlehem Shipbuilding Corp., Twentieth and Illinois Streets, San Francisco, has plans for extensions and improvements, including additional equipment. Cost close to $60,000.

North American Aviation, Inc., Imperial Highway, Los Angeles, manufacturer of airplanes and parts, has plans for two one-story additions, 20 x 390 ft., and 60 x 75 ft. Cost close to $50,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Sept. 15 for one 30-ton, standard gage, six-wheel, gas engine-powered, mechanical-drive type locomotive, for use on Boulder Canyon Project (Specification 830-D; until Sept. 17, for one motor-driven, vertical-shaft pumping unit with accessories, for use in Tule Lake pumping station No. 6, Klamath Project, Oregon-California (Specification 831-D).

San Joaquin Light & Power Corp., Fresno, Cal., in cooperation with Southern California Edison Co., Los Angeles, plans two steel tower transmission lines from connection with system of first noted utility to power substations of Southern California company at Magunden and Big Creek, Cal., for interchange of power. Cost about $1,300,000 with power switching stations and other operating facilities.

Fisher Body Co., 6901 Foothill Boulevard, Oakland, Cal., a division of General Motors Corp., has let general contract to Austin Co. for one-story addition. Cost over $35,000 with equipment.

Utah-Idaho Sugar Co., Salt Lake City, Utah, has plans for new beet sugar mill near Toppenish, Wash., comprising one and multi-story units, with storage and distributing buildings, loading platforms, power house, machine shop, pumping station and other structures. Work is scheduled to begin early in fall. Cost over $750,000 with equipment. R. L. Howard, Yakima, Wash., is State manager in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 15 for two triple-drum electric winches and two sets of spare parts (Schedule 8758); until Sept. 18, engine bottom cowls and other equipment for airplanes (Schedule 900-9964); until Sept. 25, spare parts for airplanes (Schedules 900-9969 and 900-9971) for San Diego Naval Station.

◀ FOREIGN ▶

Societa Anonima Aeroplane Caproni, Ltd., Milan, Italy, manufacturer of airplanes and parts, has closed agreement with Ministry of Industry, Government of Peru, Lima, for construction of new plant at Las Palmas, about 10 miles from Lima, for production of aeroplanes, parts manufacture and assembling, with division for reconditioning and repair service. Cost over $125,000 with equipment.

South African Torbanite Mining & Refining Co., Ltd., Johannesburg, South Africa, plans extensions and improvements in mining and milling plants, including additional equipment. Cost about $1,000,000. Appropriation has been authorized.

Midland Electric Mfg. Co., Ltd., Birmingham, England, manufacturer of electric power switchgear, electric controls, etc., has acquired a factory at Tyseley, near Birmingham, totaling about 250,000 sq. ft. floor space, and will equip for new plant.

Associated Pulp & Paper Mills, Ltd., Burnie, Tasmania, care of H. Brain, Collins House, Melbourne, Australia, secretary, recently organized with capital of $15,000,000, has awarded contract to C. Walmsley & Co., Ltd., Bury, England, paper machinery manufacturer and engineer, for design and erection of new pulp and paper mill at Bunie, where large tract of land has been acquired. Main paper-making machine, with capacity of 15,000 tons of fine paper per year, will be built at Walmsley plant and contracts placed by that company for other required mill machinery, as well as power house equipment, pumping machinery and other mechanical equipment. Work is scheduled to begin late in fall. Cost about $5,000,000, including development of pulpwood properties in Tasmania and mills for preparation of raw material for paper-making plant. Financing has been arranged in amount of $6,000,000. Amalgamated Zinc Co., Ltd., Melbourne, is interested in project.

Airplane Industry In Mass Production

WITH the announcement by the Society of Automotive Engineers, Inc., of the first national aircraft production meeting, to be held Oct. 15 to 17 in Los Angeles, estimates are given of the increase in aircraft production this year over 1935.

In the first half of this year, it is estimated, commercial plane production was 50 per cent greater than in the same period last year, while production of army and navy planes showed a gain of more than 200 per cent. Heretofore airplane manufacture has largely consisted of hand operations, but the great influx of orders has caused the introduction of mass production methods. More than $3,000,000 has been spent by airplane factories this year in plant expansions and improvements.

One of the factors contributing heavily to this progress has been the advance made in spot welding. Where, four years ago, spot welding in airplane construction was limited to one or two thicknesses of one or two materials, today a modern land plane may have 15,000 to 20,000 welds in a dozen different thicknesses of 20 or more materials. Welding currents of 1000 to 50,000 amp. may be needed, with welding pressures varying from 50 to 1500 lb., and welding setups requiring changes several times daily.

A careful study of methods for tooling and fabricating aluminum has been begun by the industry because of the importance of light weight materials in airplanes. The aircraft meeting will feature many papers by men of experience and authority dealing directly with subjects of vital interest and importance to the industry.

American Locomotive Absorbs Subsidiary

McINTOSH & SEYMOUR CORP., Auburn, New York, wholly owned subsidiary of the American Locomotive Co., has been merged with the parent company and the business heretofore conducted by McIntosh & Seymour Corp. will be carried on by the Diesel Engine Division, American Locomotive Co.

Robert R. McColl, president of the McIntosh & Seymour Corp., has been appointed vice-president of American Locomotive Co., Diesel Engine Division, and Henry T. Sherman, John Thomas and Heinrich Schneider have been appointed assistant vice-presidents.

The Diesel Engine Division of the American Locomotive Corp. will continue to build the complete line of McIntosh & Seymour four-cycle diesel designs. There has recently been added the two-cycle diesel designs of Sulzer Brothers of Winterthur, Switzerland, which are to be built and sold in America under the trade name Alco-Sulzer.